United States
Environmental Protection
Agency

Office of Administration
and Resources Management
May, 1999

Workforce Assessment Project

Executive Summary and Tasks 1-4 Final Reports

Acknowledgements

This Workforce Assessment Project report was the result of much hard work on the part of the EPA, OPM, and our contractors Toffler Associates and James Martin Government Consulting. We would like to acknowledge the very fine work of those involved.

For the U.S. Government

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U.S. Environmental Protection Agency

Workforce Assessment Project

Introduction

The objective of the EPA Workforce Assessment Project was to help the agency assess, understand, and act on the implications of strategic change for its future workforce.

The Workforce Assessment Project involved understanding EPA's current workforce competencies; identifying and articulating near-term competency gaps; envisioning plausible alternate futures the EPA workforce may face; and analyzing and identifying new competencies these alternate futures may create. This report provides conclusions and recommendations about the agency's human resources that are designed to ensure EPA continues to serve its stakeholders as it moves into the future.

In the first task, we assessed EPA's current workforce to identify the core and technical competencies currently in place vis-à-vis the core and technical competencies necessary to achieve the Agency's mission today. From this assessment, our further analysis identified competency gaps (deficiencies) between EPA's current workforce and what the Agency needs to accomplish its mission. In the course of this task, we also compared the current EPA workforce to current competencies and demographics of the national workforce. The methodology employed consisted of numerous interviews and focus groups with EPA employees at all levels, followed by analysis of competencies in terms of the current and future value of specific agency and individual employee activities.

In the second task, we conducted research and collected data for a comprehensive scan of EPA's internal and external environments to identify the drivers of change (trends and dominant forces shaping EPA's mission) that will affect the Agency in the future. This analysis focused on both the near-term future (circa 2005) and the longer-term future (circa 2020). The methodology employed consisted of primary source data gathering from EPA employees on their perceptions of the future environment. This was supplemented by extensive additional research on social, political, technological, economic, environmental, and other trends and emerging developments. The subsequent analysis used a creative affinity-grouping technique to coalesce scores of important shaping forces into three multi-dimensional drivers of change tailored for EPA.

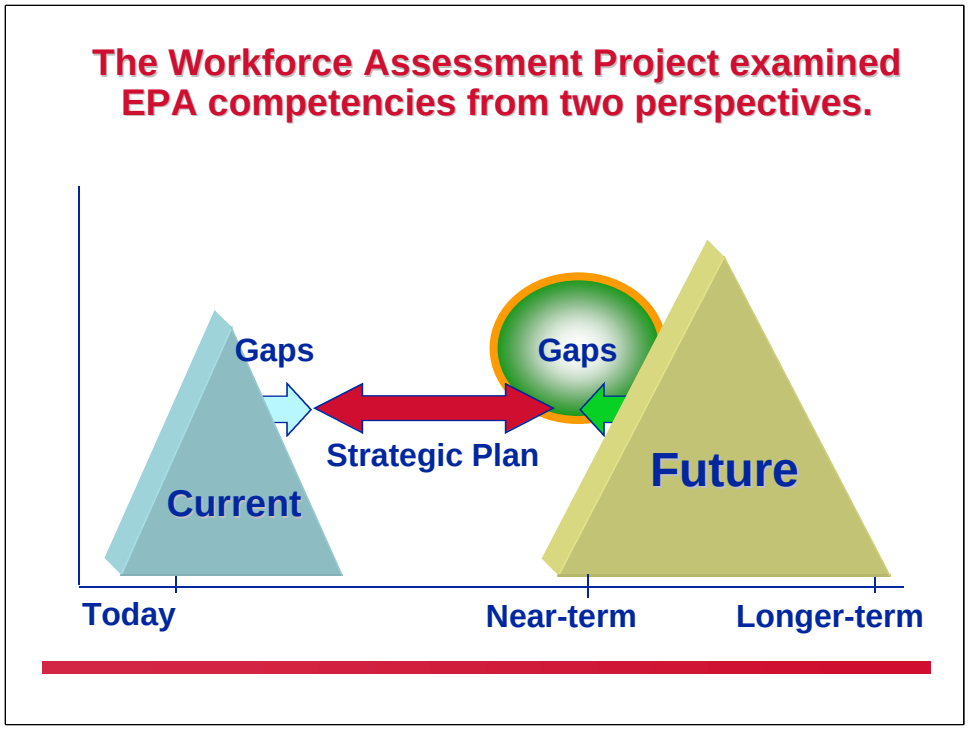
In the third task, we used the three identified drivers of change to develop four scenarios (alternative futures) of EPA's possible internal and external environments. The timeframe for the scenarios was purposefully left undefined, but was broadly conceived as being within 2010 to 2020. The scenarios included rich, evocative descriptions of environmental features in seven areas: domestic politics; international politics and economics; social environment; demographics; technology; environment and related issues; and work and workforce-related issues.

For each scenario, implications for the future EPA's mission, workforce, and workforce competency requirements were outlined and analyzed. The methodology employed consisted of Toffler Associates' "alternate futures" scenario development approach.

In this approach, we envision the interactions of three multi-dimensional driver forces at their respective extremes. Each of these interactions (three drivers each at their two extremes yields eight possible combinations) provide the framework for an internally consistent scenario, and four of these eight scenarios are selected for further development and analysis.

In the fourth task, we used the data collected in Tasks 1 and 2, and the insights about possible futures developed in Task 3, to identify competencies likely to be critical to EPA's mission in the strategic future (somewhere between 2005 and 2020). We also identified where significant gaps could emerge if the EPA does not begin in the near-term to cultivate these projected mission-required future competencies. The methodology employed consisted of analytical brainstorming with the data and insights in hand, supplemented by extensive vetting with senior EPA experts and a broad range of external data sources from among EPA's stakeholders and customers (e.g., the regulated community; Congress; academia, environmental public interest groups; other relevant Federal agencies).

The original design of the Workforce Assessment Project called for two additional tasks. The intended Task 5 was to prepare an integrated comprehensive work-force strategy, with recommendations for recruiting, developing, and maintaining needed competencies in the current and future workforces. The intended Task 6 was to recommend a workforce planning process, with implementation guidelines, that would be integral to the Agency's strategic planning process. This workforce planning process was intended to allow EPA to continually monitor and assess EPA's workforce in light of internal and external environments, including an evaluation component or progress indicators for measuring the success of an ongoing workforce assessment process. Implementation of the Workforce Assessment Project's findings and conclusions may address these tasks in a subsequent, follow-on project.



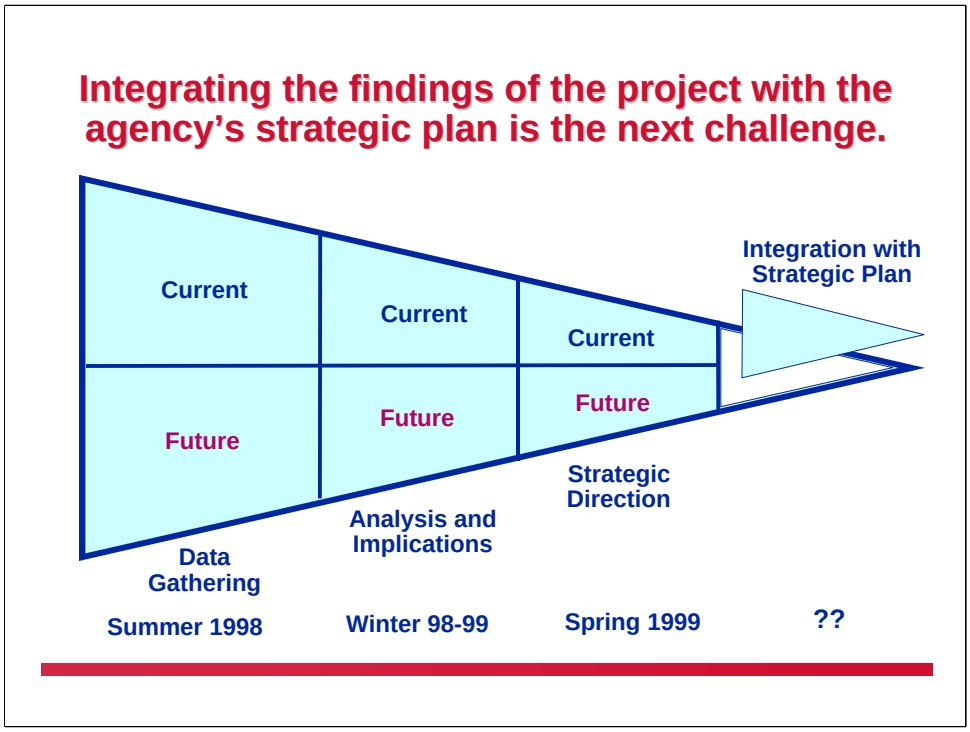
This slide represents the relationship between the current and future competencies portions of the Workforce Assessment Project.

In Task 1, we assessed current EPA workforce competencies and gaps and made recommendations for improving agency competencies in the near term.

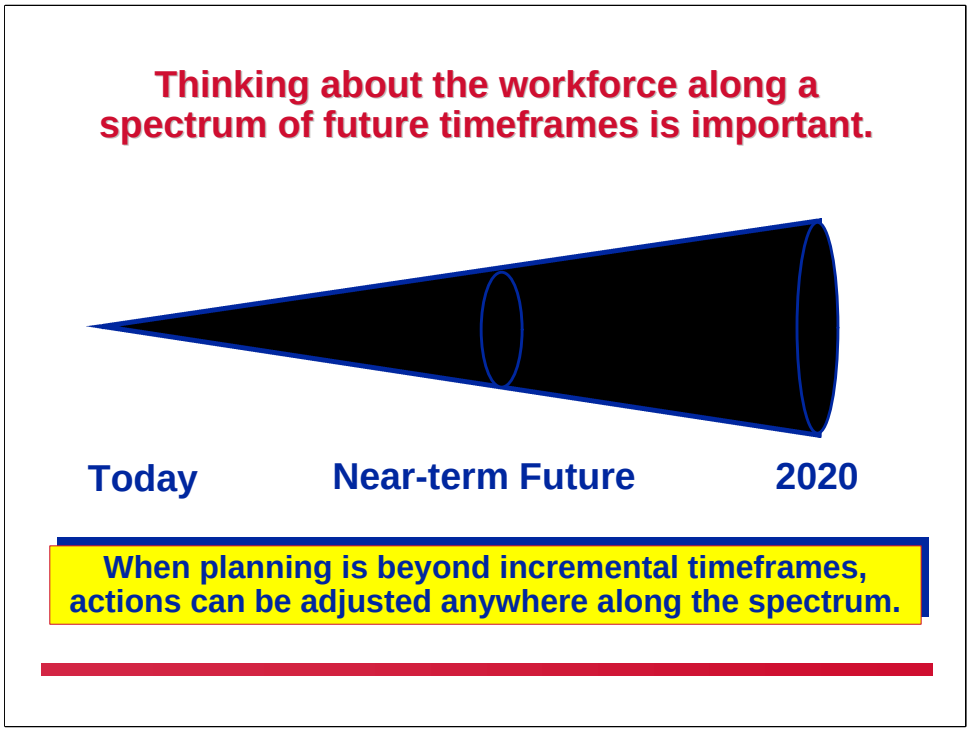
In Task 2, we articulated multi-dimensional drivers of change, taking into account a range of political, economic, technological, environmental, social-cultural, and other forces.

In Task 3, we developed a series of plausible future scenarios to serve as a conceptual backdrop for thinking about the implications that might emerge from the interactions of driving forces for EPA and its workforce.

In Task 4, we focused on competency requirements for the EPA workforce of the future. We drew in this task on the insights derived from data-gathering and analysis in the first three phases of the WAP, on additional analysis by the project team, and on discussions with a variety of experts outside the EPA.

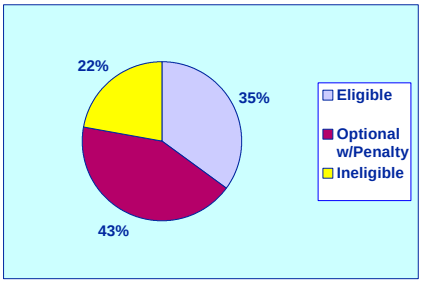


- This diagram represents the segments and timeline of the Workforce Assessment Project. Beginning in the summer of 1998, we gathered data from all parts of the agency, identified and analyzed current competencies and gaps, and recommended actions to be taken to fill those gaps today.
- Simultaneously, and into the winter of 1998-99, we conducted a scan of the EPA's future environment, identifying salient forces and drivers of change that may have significant impact on the agency and significant implications for its future workforce requirements. We subsequently developed four alternate future scenarios and described the impact and implications of each for the EPA.
- In the spring of 1999, we identified issues and developed themes around potential future competency gaps for the agency. Workforce requirements for the agency were identified that cut across the four very different future scenarios. Conclusions were organized into four categories, laying out a strategic direction for the workforce.
- To implement the findings and recommendations of the project effectively, it will be important for the agency to develop a strategy for developing the EPA Workforce of the Future. It will also be important to integrate this workforce strategy with the agency's larger strategic planning efforts.

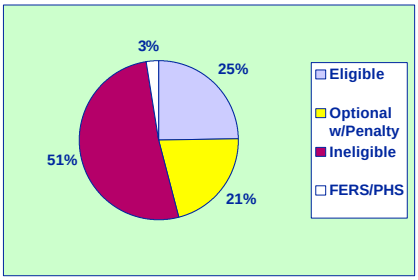


- The Workforce Assessment Project was designed to look out to a relatively distant future -- circa the year 2020. The intent was to stretch the thinking of agency workforce planners about how different tomorrow's world might be from today's.
- While this kind of planning horizon is longer than many organizations employ, the value of these long-term insights is gained by looking back from the future to nearer-term challenges and issues. By looking out to 2020, agency workforce planners are better prepared to understand the events and developments that might lead to different potential futures, and thereby better able to understand what steps need to be taken in the near-term to develop the workforce that will be needed in the out years.
- By looking far into the future we avoid the traps of more incremental plans, thereby being better prepared for a future that will inevitably be discontinuous from today. Strategic adjustments to workforce plans can be made continually as the future unfolds.

A significant number of staff will be eligible to retire by FY2005.



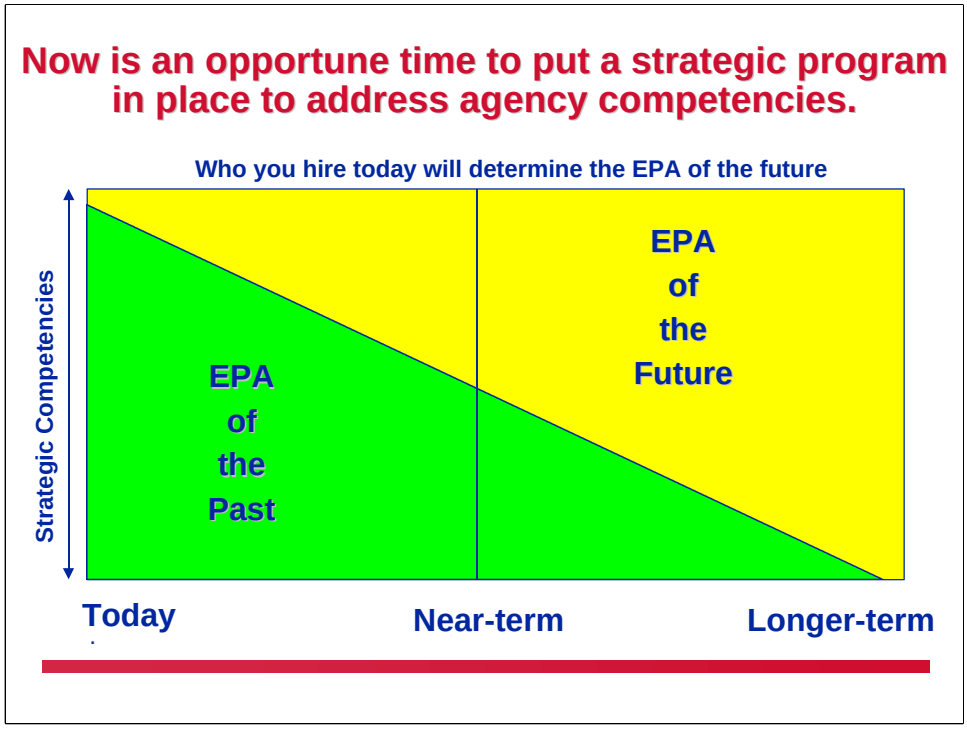
SES employees



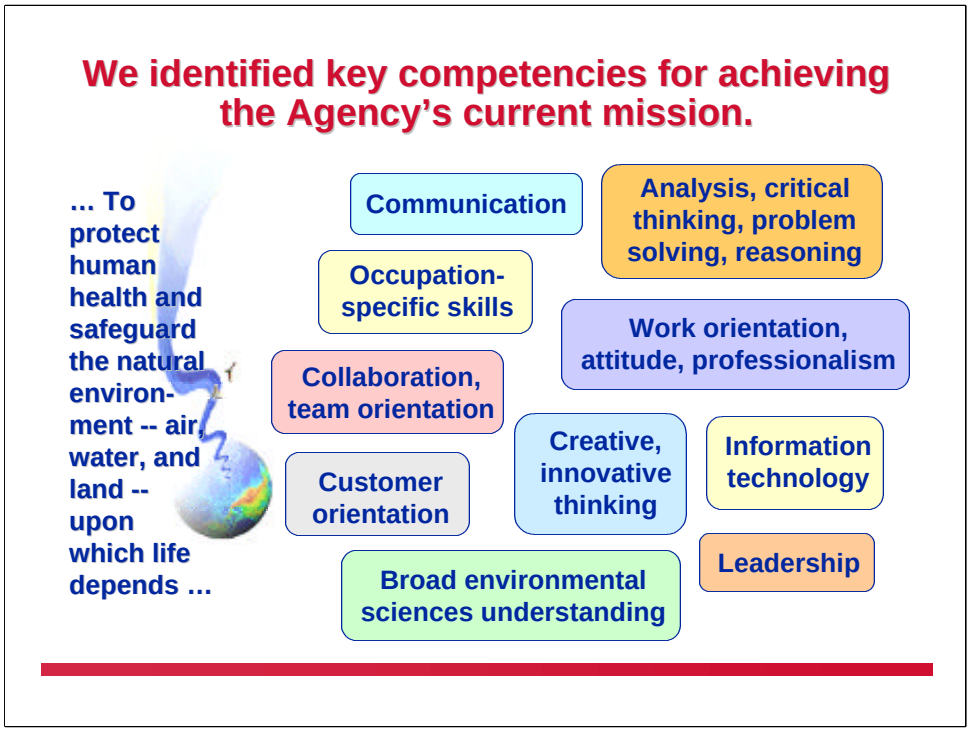
All permanent employees
-excludes experts & consultants

Source: EPA data as of 4-24-99 and 4-11-98

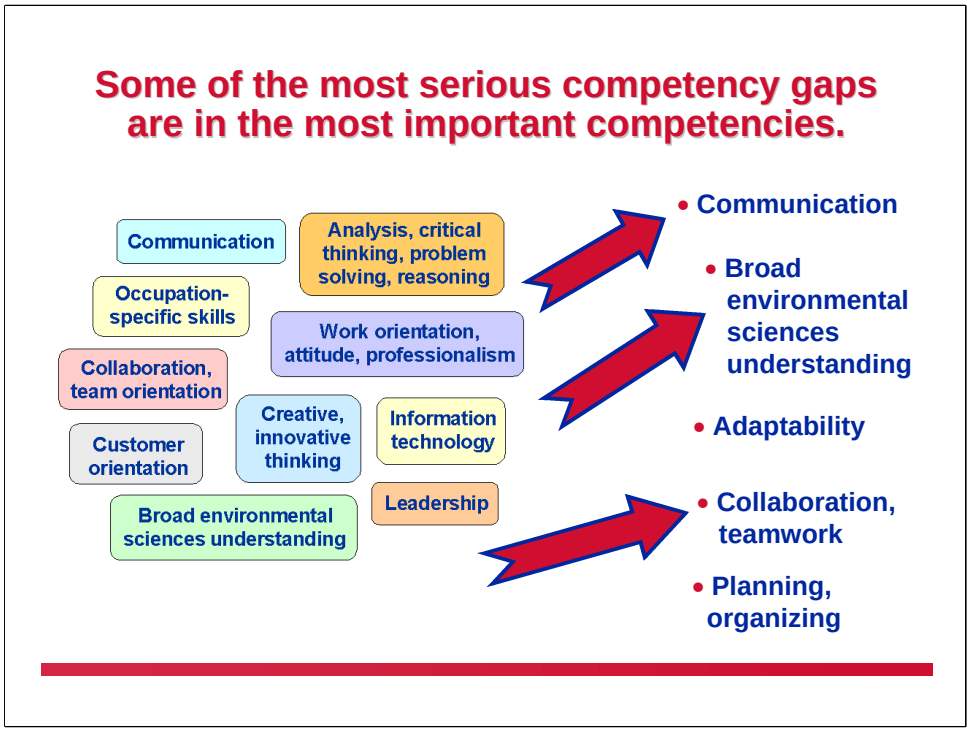
- A review of the agency's workforce demographics shows that employees are likely to begin retiring in record numbers within the next few years.
- Once hired, people have historically stayed at the EPA: 41% have more than 16 years service; turnover has been less than 7%. By contrast, nationally, employees stay with their employers on average less than 4 years.
- The greatest numbers of retirement-eligible employees are in senior management. Nearly 80% of the SES group can retire by 2005, albeit some with a penalty assessed against their retirement benefits. The number is still nearly 60% when GS-14s and GS-15s are added to SES. Nearly one-half of the overall workforce will be eligible for retirement within the next five years. A smaller, though still significant 25% of the scientists and engineers fall into the optional and eligible-with-penalty group.



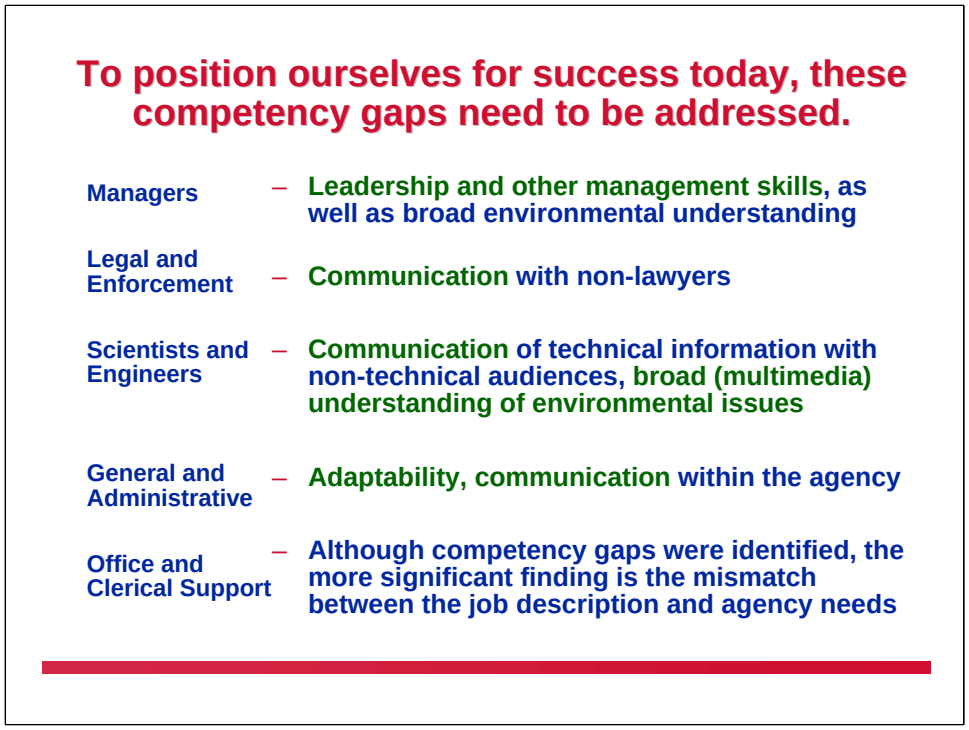
- This chart is another way to look at the demographic data just discussed. It is intended to depict the choice and the opportunity that EPA faces with regard to its workforce.
- Even if all of those eligible do not retire when their age or years-of-service milestones are met, a major change is inevitable in the near future. While on the one hand this is a challenge, if properly exploited there is also a unique opportunity for the agency to develop and implement a strategy to create a workforce optimally qualified for the challenges we will face in the future.
- EPA can be reactive to the loss of the workforce of the past, or it can elect to take advantage of this thinning of the current ranks and to think through the requirements for the workforce of the future. Now is the time to rethink how the agency can meet its goals, what kinds of skills will be needed for the future, whether to keep the work inside or to outsource, and other alternatives.
- An important implication of the demographic figures is the need to examine hiring processes and, as the retiring workforce is replaced, make appropriate changes to streamline the accession of people with competencies attuned to the future environment.
- Equally important is the need to develop retention devices that will enable the agency to hold onto its best and brightest so they can help create a new culture in the workforce of the future.
- In any event, the leadership needs to be prepared to manage in an environment of dramatic change. And picking the right people to participate in the organization's work is a fundamental responsibility of its leaders.



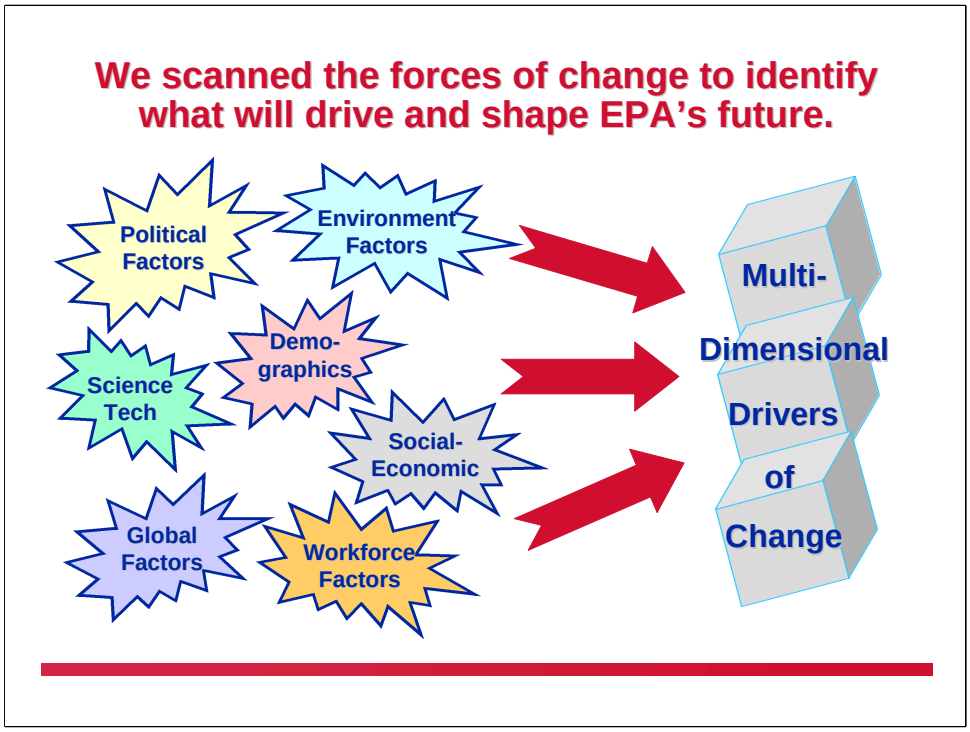
- This slide shows the ten most important competencies identified by our assessment. Many important competencies were identified, and these are described in more detail in the Appendix to the WAP Task 1 Report.
- To determine which competencies were of greatest importance for the agency to fulfill its current mission, all of the competencies described in our interviews were compiled and tallied, aggregated into similar categories, then analyzed in terms of what each EPA occupational group needs to succeed.
- The competencies listed here are the areas in which, overall, the agency needs to excel. Of course, the competencies needed for specific jobs, and their relative importance in each job, will vary. Some individuals demonstrate many or most of these competencies, but at the same time, not all these competencies are needed for all agency jobs. Likewise, all of the competencies are present to one degree or another within the agency today.
- Communication emerged as most important of all of today's competencies. We identified multiple dimensions of this competency. It was also seen as particularly important for EPA employees that they be top-notch in their individual areas of expertise. It is critical for agency professionals to work well with colleagues with different kinds of expertise in order to bring their own expertise to bear effectively.
- Given the nature of the mission, perhaps even more than other Federal Government employees, EPA professionals need always to think of the people they serve. It is important to be good thinkers and problem solvers, approaching responsibilities conscientiously but also creatively. As in all career fields today, ability to use information technology is increasingly important. Finally, it was clear that EPA professionals must demonstrate leadership -- to each other and to the public.



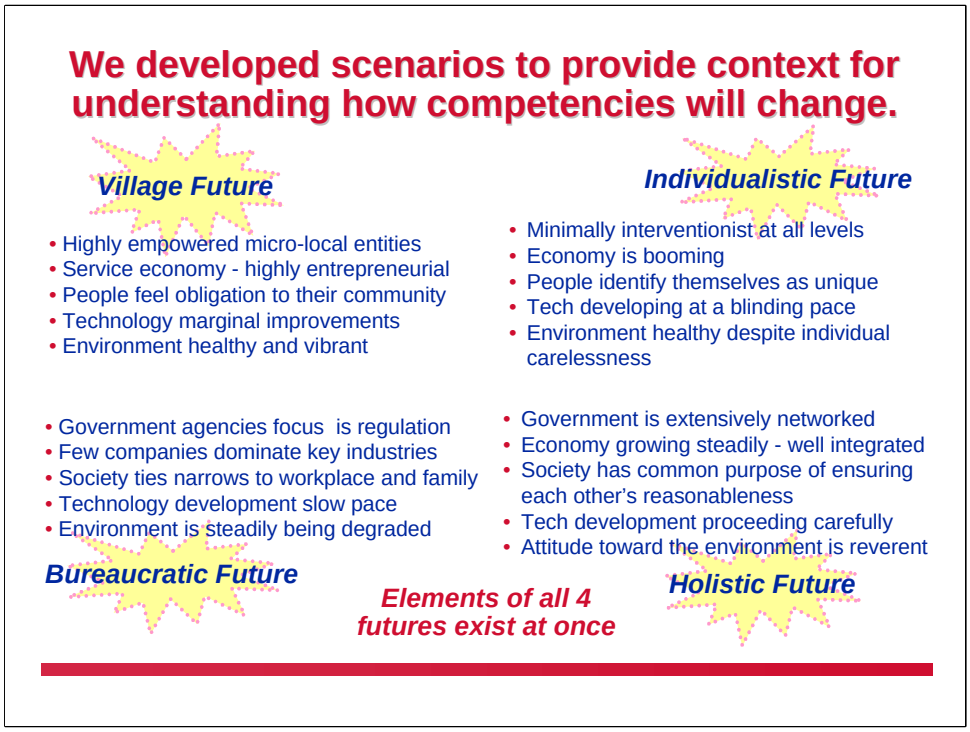
- When examined in the aggregate, some of the agency's competency gaps are in areas that were identified as among its most important competencies. On a certain level, this is easy to understand -- particularly in areas of great importance, continual improvement is always important, and people always feel an obligation to do better. At the same time, the fact that there are gaps in these important areas suggests a clear path for training, educational, culture change, and other efforts to develop the competency base of the current workforce.
- It must be noted that, of course, not every individual, or all the individuals in any one occupational group, demonstrates deficiencies in any or all of these gap. Like the competencies themselves, some individuals demonstrate some of these gaps, and at the same time, not all these gaps are salient concerns for all agency jobs.
- Overall, it is important to be aware of the gaps that were determined to be the most critical. Any effort to improve the agency's competencies should include attention to these areas.



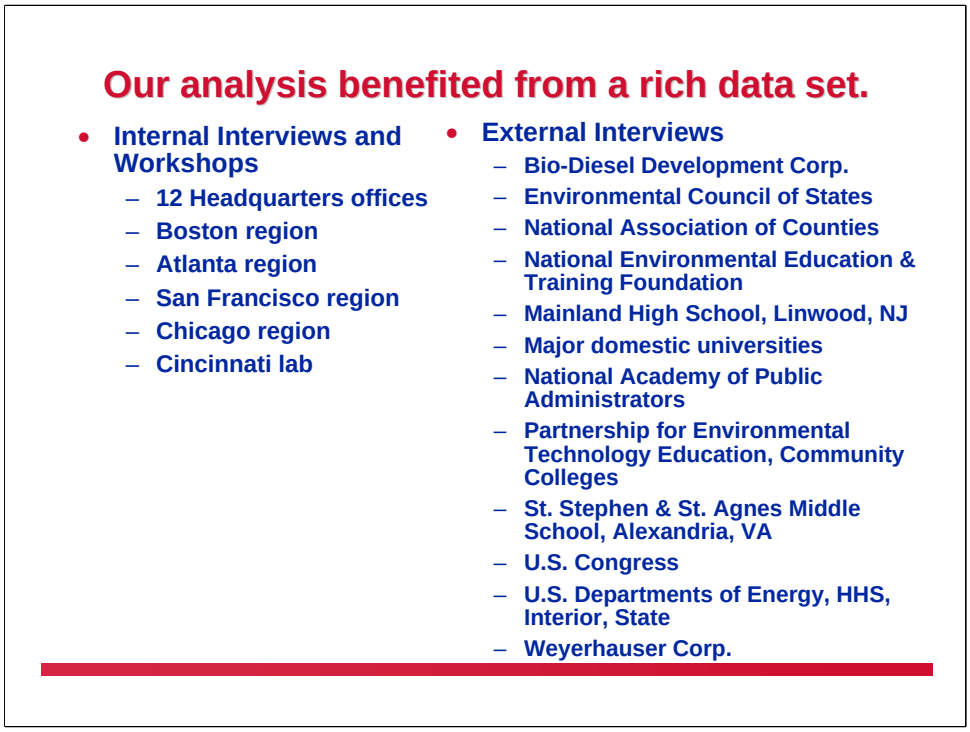
- Our assessment determined that, while an aggregate list of gaps across the agency can be identified, this broad a perspective is not as useful as examining each career category group individually for gaps. The responsibilities of each group are quite different. At the same time, some common themes did emerge across all career categories. For example, and most importantly, communication competencies were consistently cited as needing improvement, agency-wide.
- In the management group, we found leadership to be the most significant gap. Managers were not seen as sufficiently able to take calculated risks or make the bold decisions necessary for an increasingly uncertain and multi-faceted decision environment.
- Scientists and engineers communicate well with one another, but do not communicate effectively with non-scientists and engineers. In general, scientists and engineers also need to broaden their capabilities beyond the confines of any narrow discipline to integrate other hard and soft sciences. Many of the same findings were reached in examining employees in legal and enforcement-related jobs, particularly with regard to communication with colleagues in other career categories.
- Administrative professionals (e.g., budget officials, contracting specialists, human resource and other resource management experts, etc) were cited as having improved their service orientation, and they need to focus on adapting to new ways of operating in a changing environment. They also need to focus on better communication of often-complex administrative rules, regulations, and processes.
- For the clerical group, we did not find competency gaps so much as we found a mismatch between the skill sets and the changing nature of what kind of support is needed by agency management. This is not a failure of the employees to live up to expectations, but rather a problem with management's identification of what they need. Traditional clerical tasks such as typing, answering phones, etc are less necessary, while critical thinking skills are becoming more important for support staff to assist their employers. The job descriptions for these positions need need to change to better match the emerging world, and current staff needs to be developed to meet new expectations.



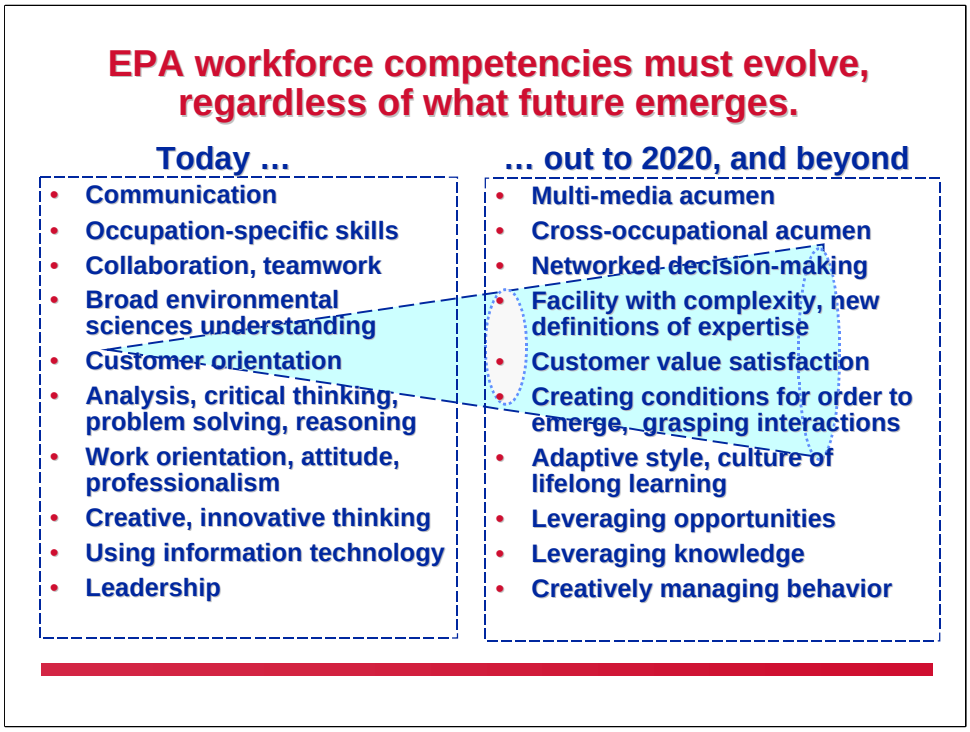
- This slide depicts graphically the process by which we examined the EPA's potential future operating environment. It shows how we gathered and interpreted data and insights to identify key drivers of change that could affect the mission and the workforce competency requirements of EPA.
- We explored a range of forces that could be important shaping influences on EPA. Numerous members of EPA's workforce were key sources of information and insight on these forces.
- The premise underlying the environmental scan task is that drivers of future change are multi-variable *combinations* of forces that already exist or are emerging in the society. Some of these forces are global, some are specific to a particular country (in this case the US), and some are specific to the organization for which the drivers analysis is being conducted (in this case the EPA). Another way to characterize the breadth of relevant forces is to see them as external and internal forces, such as the examples provided on the slide.
- Numerous forces act on an organization at any given time. The key first step in identifying drivers is to select which of these are most salient. But even once this is done, such forces do not operate in isolation. The real drivers of change are the "meta-forces" that emerge when individual like and unlike forces interact with one another.



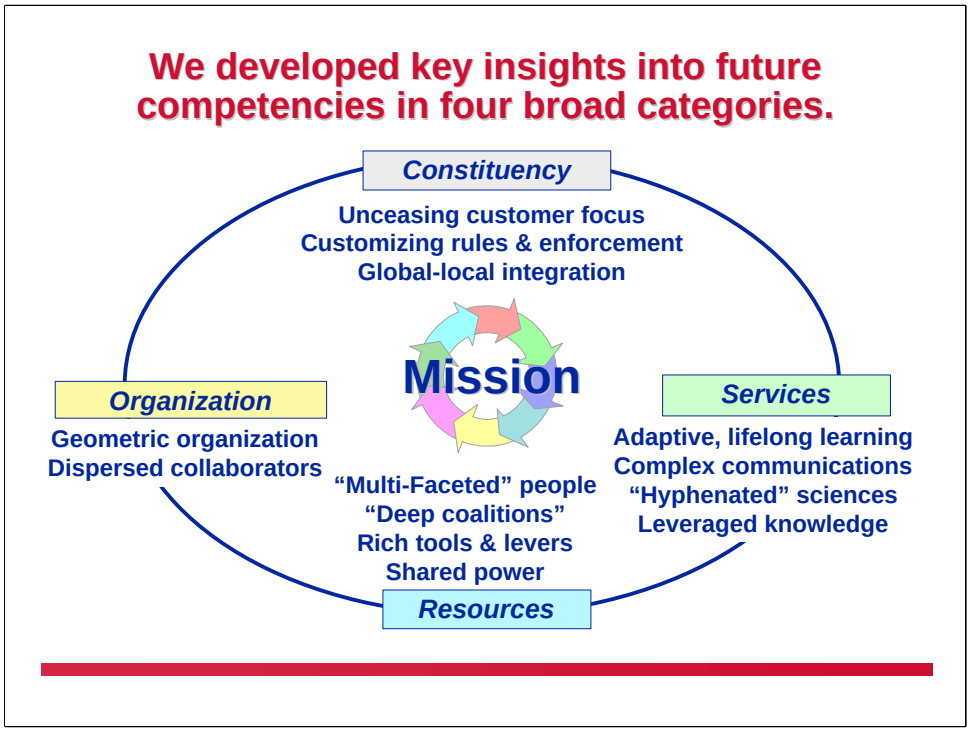
- This slide summarizes the four alternative future scenarios developed in Task 3 of the Workforce Assessment Project. The development of these scenarios was a creative process that used as its foundation the input gathered from approximately 300 individuals inside and outside of the agency. The process was supplemented by considerable research into possible real-world future outcomes. The scenarios themselves are based on a framework of extreme manifestations of the identified driving forces of change. Numerous rich and detailed features were imagined for each world and woven into four separate stories. The stories reflect the ideas heard in our interviews and focus groups.
- The complete scenarios are included in the WAP Task 3 Report.
- The purpose of the scenarios was not to predict a future. Rather, it was to envision several logical, coherent, detailed and plausible future operating environments for the EPA. The scenarios recognize that the future will be a non-linear change from the present, and therefore cannot be predicted. Plausible, reasonable outlines can be anticipated, however, and strategies that play out well across several possible futures can be developed to improve decision-making abilities. In this project, they were used to improve critical workforce development strategy decisions beyond the incremental changes used in most planning efforts.



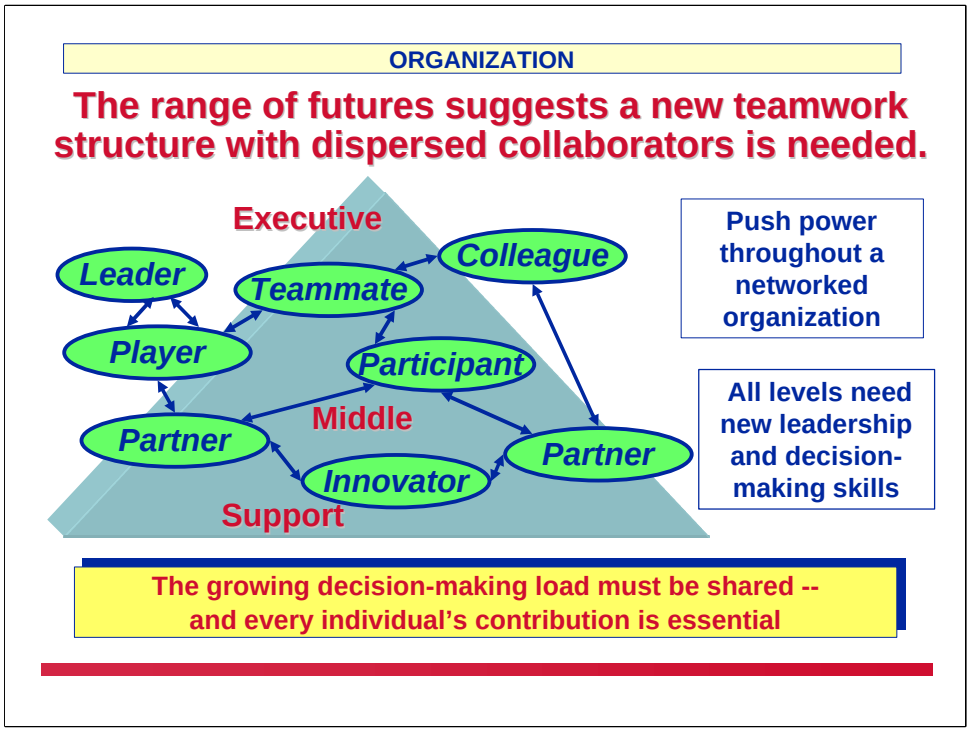
- In the course of the fourth WAP task, we reached out to a number of experts outside the EPA to gain some insights into how others see the task of environmental protection changing. Many of these individuals have extensive experience dealing with EPA officials in the course of their own jobs, and we also queried them about what skills and competencies they saw as most important to EPA's success, today and in the future. The analysis, conclusions, and recommendations about future workforce requirements, grounded in our primary-source understanding of EPA's current competencies, our understanding of key drivers of change, and our analysis of the alternate future scenarios, was importantly informed by the insights of these external individuals.
- This slide shows the range of external experts consulted in Task 4 of the WAP. Descriptions are in terms of organizations rather than the names of specific individuals, as anonymity was assured to gain the candid views of the people we interviewed.



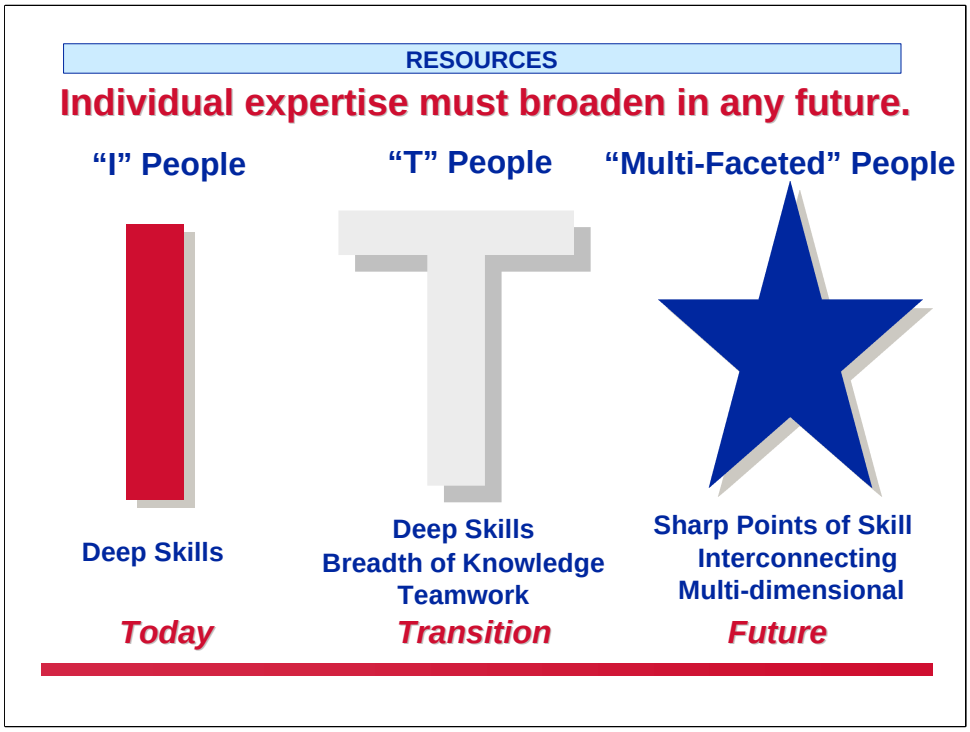
- EPA's competencies must evolve. Although the need for today's competencies will not disappear, the abilities needed to meet future demands will be more sophisticated, complex, and interdependent.
- Multi-media acumen is the ability to be understood by diverse audiences using a wide range of communication modes. It requires familiarity with technology applications to improve message clarity.
- Cross-occupational acumen: employees will still need deep understanding of their fields, but will also need to integrate and apply a broader array of skills and related concepts. They need to know how to maintain access to a wide range of "up-to-the-minute" information that affects their work.
- Networked decision-making is the ability to interact with numerous and varied partners throughout the agency to determine actions to keep pace with new challenges. Employees must develop new collaborative and leadership skills to work together in new and different ways.
- New definitions of expertise acknowledge that deep knowledge of a discrete field remains valuable but is by itself not sufficient for tomorrow. Employees need to develop an increased awareness of how their specialty fits in a broader perspective and an increasingly complex decision-making environment.
- Customer value satisfaction is understanding and working with customers and knowing what matters to them deeply enough to anticipate and meet needs their needs in innovative ways.
- Creating conditions for order to emerge means appreciating outcomes over process, and working to enable constituents to negotiate customized solutions for themselves, not trying to impose order from above.
- An adaptive style and culture of lifelong learning means being open to change, to new approaches and tools and relationships, and to the demand for constant development of innovative solutions.
- Leveraging opportunities means understanding that there are new models for operating in the future, many of which will only become apparent in real time as we interact with others. Employees must appreciate these when they arise and be flexible enough to try new, unproven things.
- Leveraging knowledge means going beyond mere use of information to communicating, disseminating, and employing data, ideas, symbols, and symbolism to educate, shape ideas, and influence behavior.
- Creatively managing behavior is leadership that fosters innovation, engagement, and a productive work environment. It is appreciating different work styles and providing access to the tools required for optimum effectiveness. It is removing organizational obstacles and creating a culture that fosters continual learning.



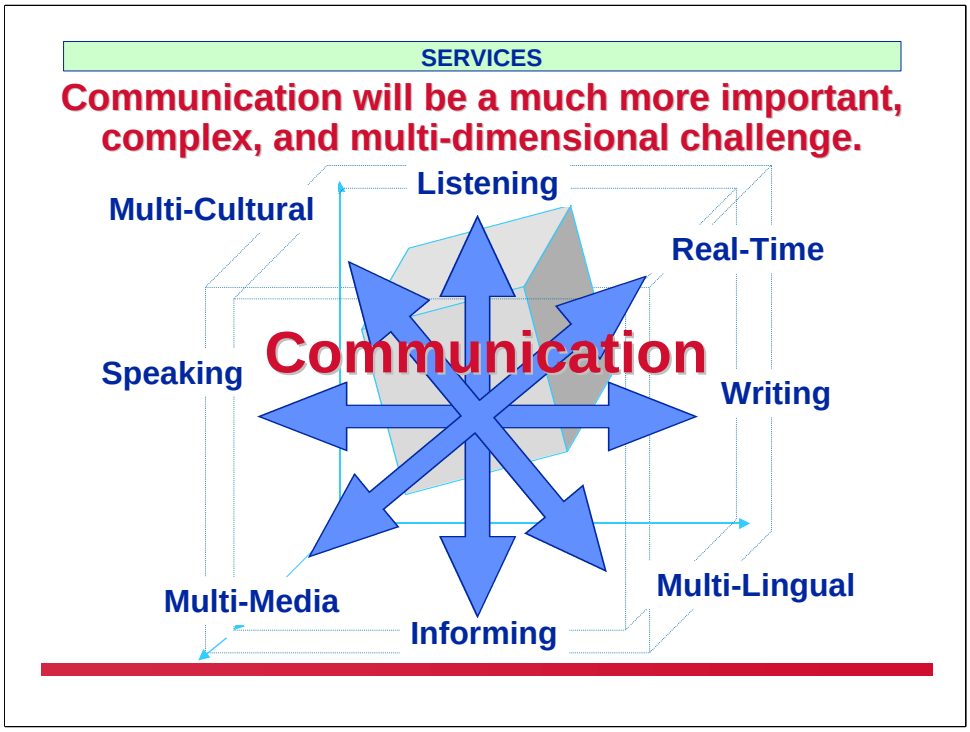
- Our analysis of the agency's future competency requirements led us to define four key categories for thinking about and acting to create a workforce for the future.
- **Organization**. To improve its ability to address emerging environmental issues and threats, EPA will need to develop enhanced relationships with a host of other relevant, dispersed players. They will have to establish innovative new "geometrical" organization forms to take advantage of the full capabilities of their employees and other stakeholders.
- **Resources**. The greatest resource of the EPA will continue to be its people, but people must change to meet the changing world around us. Multi-dimensional environmental problems will demand multi-dimensional people -- flexible, adaptive people able to integrate a variety of disciplines. These people will have to work together at multiple grade levels in "deep coalitions." They will need to bring a rich menu of tools, techniques, and levers to bear. They will have to work to foster and generate shared power among the entire diversity of the EPA constituency.
- **Services**. Information, knowledge, and communication will play an ever more central role in helping EPA fulfill its mission. These are skills and tools that must be exploited to their fullest to provide powerful new kinds of services. EPA increasingly will move beyond tangible means of environmental protection, like regulations and technologies, to use knowledge to shape people's behaviors and expectations. While the emerging future creates opportunities for environmental protection, it also multiplies the challenges and the complexity. EPA will have to contend with an era where sciences merge with each other and with social-cultural factors to shape our environment. Artful development and application of knowledge resources will enable this.
- **Constituency**. By building a larger, more global network, EPA increases its knowledge and hence, its ability to serve its customers. As transactions with the environment grow in number and complexity, policing individual actions becomes more difficult, and more customized, flexible, outcome-oriented rules must be developed. A robust global network is essential; everyone must be involved because everyone and everything is increasingly interconnected.
- The agency's mission must become a shared vision with the American people, and ultimately the people of the world. Historically, the agency's mission has been defined by the Congress and the agency itself; in the future, EPA must listen and reflect the environmental mission that embodies the will of the people, expressed in terms they understand and support.



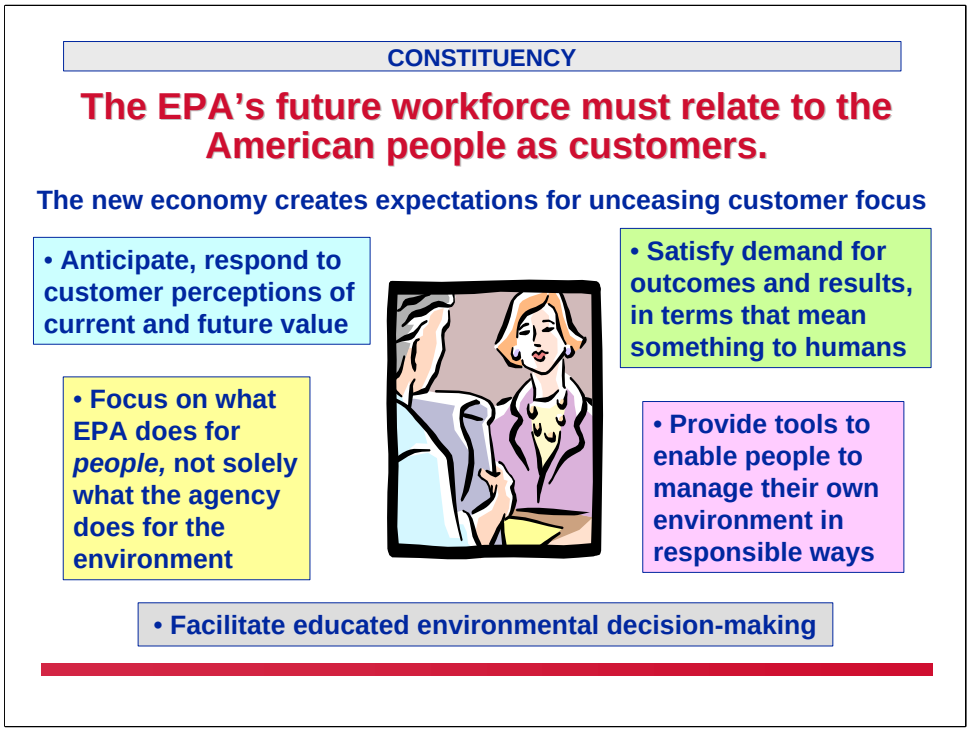
- The EPA, like other government agencies, is organized hierarchically, albeit the organization is flatter than a few years ago.
- Although government's unique role may prevent it from ever operating like a business, EPA can adopt new ways of organization and new approaches to increase its flexibility in pursuing environmental protection goals. The value of adding players to the agency's network increases exponentially as more people are added. Leadership becomes proliferated throughout the organization as expert teams move from success to greater success.
- A challenge is to develop new collaborative skills to unleash the potential of the agency's staff as they work together in new and different ways. These new skills include the ability to work more alongside colleagues from every grade level, as well as outsiders, with power and decision-making authority widely distributed as necessary for a given task. In the new organization, individual roles shift from one project to the next. On one project, an individual may be the leader, on the next he or she may provide support. The ability to "let go" and collaborate becomes a critical competency.
- In a more networked agency, internal and external relationships are amplified in importance. However, a major challenge for the agency is to leverage its own internal knowledge resources by fostering a larger, more robust network of players from throughout every part of the agency.



- This slide illustrates the transition in the kinds of expertise that employees of the EPA will need in the years to come. The key lesson for the workforce is that individuals must have deep enough knowledge of a variety of fields to know where to look both inside and outside the agency to get the skill they need--and know how to marshal the resources to obtain it. These people continually seek out new knowledge and apply it in teamwork and network interactions with others inside and outside the agency.
- EPA people today tend to be deeply and rather narrowly expert in a particular area or discipline. This kind of expertise can be thought of as shaped like the letter I. The need for that kind of specialization will continue in some cases, but people must also have broad, if less detailed, understanding of other fields. Rather than I-shaped, these people could be seen as "T-shaped" in their knowledge base. Over time, EPA will need people with a degree of depth in several fields, which may not even be closely related to each other. They won't be quite as deep in any one field, but knowledgeable enough in several fields to be effective in different roles. Not I-shaped or T-shaped, many EPA people in the future must be "Multi-Faceted."
- Breaking down organizational boundaries will provide the kind of environment where this transition can begin to evolve. By working in new multifunctional teams, by actively participating in network interactions, and taking calculated risks, individuals learn in more powerful ways than any training class could provide. This self-directed type of learning is exciting, it improves motivation and drives a desire to learn more. The obligation for managers is to create the kind of environment and culture that fosters continual learning. Innovative new ways to preserve and protect our world will inevitably follow.



- The dimensions within in which we communicate are continually expanding in number and complexity. Effective communication depends on a broad range of skills and abilities, including the ability to gather enough information to understand one's audience in order to present a message that is clear and complete.
- To communicate successfully, the agency and its employees need to have a new repertoire of skills ready to make themselves understood. The public is increasingly sophisticated and has access to more information than ever before--some of it reliable, some worthless. One role of the EPA is to help the American people to make sense of the environmental information deluge.
- Rather than mass communication, increasingly we need more customized communication. We can and must rely on technology, but more important will be the communication skills of our people, in all career categories. Multi-media acumen -- an ability to listen and communicate multi-lingually, through a variety of means, in real time, etc -- is critical to communicate with large numbers of people in a diverse culture and environment. The EPA must become extraordinarily adept at providing and using two-way and multiple-way channels for customized communication in any number of modes and styles.



- Customers are accustomed to increasingly high levels of service and product innovation from business in a global market that is able to meet their individual needs. It is not sufficient to wait for customers to request support or services. Customer needs must be anticipated.
- Taxpaying government "customers" likewise expect value for their tax dollar. Satisfying customers' perceptions of current and future value will mean developing innovative solutions that protect the environment while enhancing people's lives. It will also mean involving more participants more deeply in the process of defining the environmental protection problems and solutions. The agency must communicate with the public using terms and measures that mean something to them. Customer value satisfaction will mean working with and constantly learning from our customers to help them achieve their goals.

- Different planning timeframes were considered within which the agency could address its staff development efforts. Traditional planning efforts are consistently too conservative because they fail to acknowledge the discontinuous events that shape our real world. Most planning efforts miss opportunities and fail to anticipate specific key challenges. To stretch thinking, it is important to consider futures that encompass revolutionary changes -- the scenarios developed for the WAP do this by design, and thereby enable us to think about the hardest possible challenges.
- Having imagined these possibly radical futures, however, it is important to step back and think in terms of a more strategic future -- one that is near enough to today to encompass the *most urgent* challenges, but still out beyond most planning horizons. This is the future that can be influenced by near-term decisions and actions designed to position the agency advantageously for any emerging real-world future. The people hired today to replace the retirement wave must be flexible enough to continually expand their horizons and grow professionally.
- Demographics suggest the agency will soon experience an unprecedented number of employee retirements. Responding to this challenge in the strategic future will require innovations in the ways EPA recruits, hires, and develops employees. Bringing in the right talent is one of the most critical issues facing the agency. The expected employment changes can be used to the agency's advantage as it prepares to meet the accelerating challenges of environmental protection. New competencies and new ways of operating will be needed. At the same time, the agency needs to ensure that it retains the knowledge of its departing workforce as much as possible.
- Our conclusions and recommendations are designed to help EPA see past current uncertainties and make decisions about how to build a competent and productive workforce for the strategic future. Many of the workforce requirements expressed here are already emerging as challenges today. Nevertheless, seeing these needs in future terms prompts us to apply future-focused solutions.

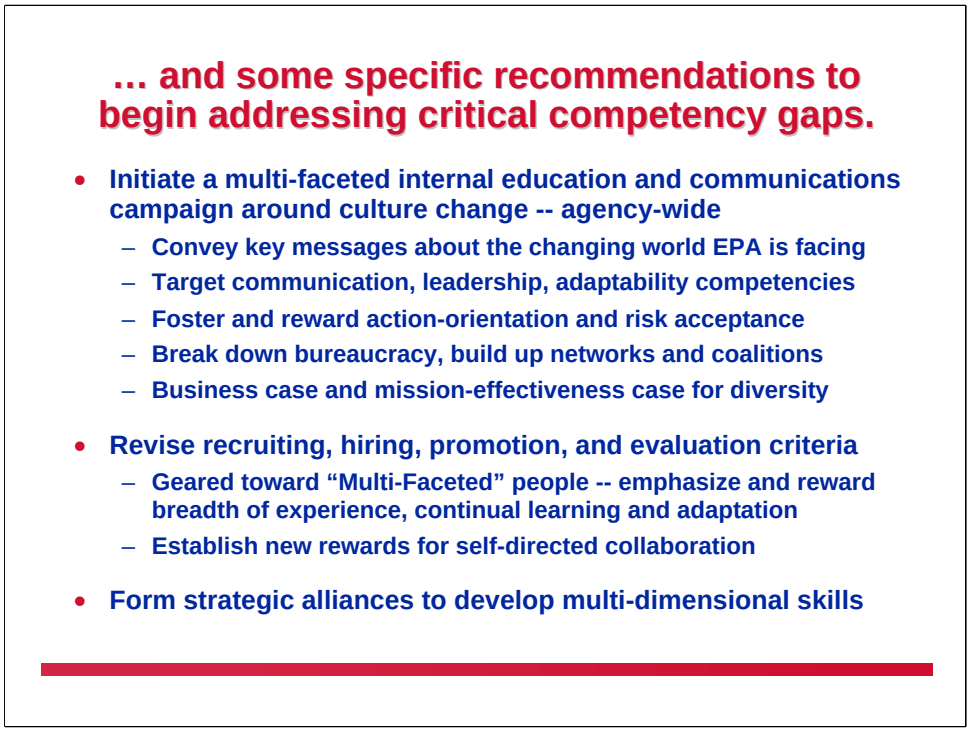
- EPA workforce planners need to change their assumptions about the future environment and the agency's traditional ways of doing business. New directions, new ways of operating, new skills all amount to a major culture change that must occur in order to prepare the agency for its future.
- The agency needs to address its current workforce competency gaps and its future workforce needs simultaneously.
- The current gaps should be the focus of a multifaceted culture-change campaign, carefully planned and communicated throughout the agency and then beyond the agency. Getting people to understand the need for change is a critical step that must be communicated well, so that it energizes rather than paralyzes the workforce.
- The most important step the agency can take to address its future workforce needs is to begin developing a "Workforce of the Future" strategic plan. Understanding the challenges of the future and the kinds of competencies that will be needed is critical, but this understanding will not be employed effectively unless a thoughtful strategic plan is put in place for recruiting, hiring, and nurturing the EPA employees of tomorrow.
- Both of these initiatives must be made an integral part of the overall agency strategic plan. Policies and procedures must be developed to implement these strategies and to accelerate the pace of change throughout the agency to meet its changing needs.

Our analysis on current agency competencies led us to a number of conclusions …

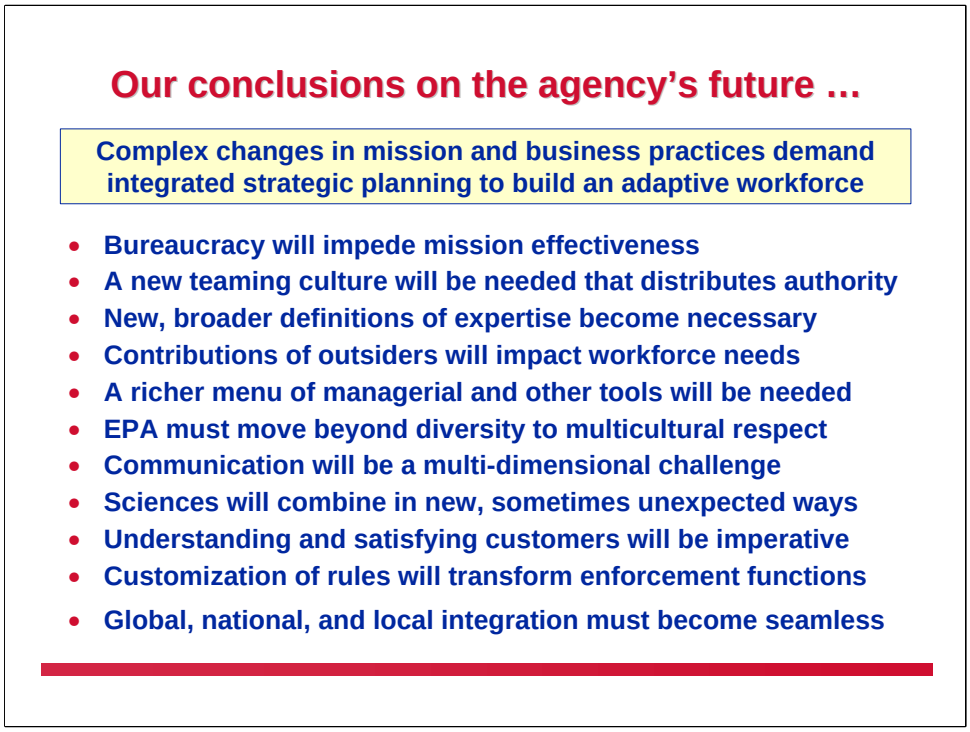
The rest of the agency needs to see workforce competency issues with the same urgency as the WAP

- **Communication is a critical competency and a widespread gap**
- **The agency's technical focus is too reactive and near-term**
- **Scientists and engineers need broader, cross-discipline skills**
- **Newer employees are not prepared well for management roles**
- **Support staff roles and responsibilities must be redesigned**
- **Employees don't yet understand the new flatter hierarchy**
- **Navigating the political-bureaucratic environment is a key skill**
- **Training efforts are tactical, not strategic**
- **Recruiting is critical, particularly scientists and engineers**
- **The coming talent war will make retention a new concern**

- Information-sharing, both inside and outside of EPA, is a critical capability that must be improved. Staff need to have a facility with multiple modes of communication. They must be able to communicate one on one and in groups and be able to relate complex concepts to those with non-technical backgrounds.
- A great deal of attention is focused on long-standing, relatively well understood environmental issues. Groundbreaking work in new areas where successes are less certain and tangible may ultimately provide bigger payoffs.
- Increasingly complex environmental issues require a more diverse and better integrated approach that considers not only multiple sciences, but the economic, social, and political as well.
- Management's role is changing rapidly, but the various programs to develop younger EPA employees into leaders and managers of the future are insufficient to prepare them for the challenges they need to address. Training courses are important, but they are not enough.
- We have seen dramatic changes in what management needs its support staff to be capable of, but the agency has only just begun to make the appropriate adjustments to the roles and responsibilities of the staff hired for (or working in) those support jobs.
- Flatter organizations can be more adaptive to a rapidly changing environment. At the same time, EPA is having trouble letting go of the old hierarchy, sending a confusing message to employees.
- The most successful employees have developed a creative ability to be productive within the bureaucracy. This ability is not generally acknowledged as a key competency, but it is and it must be cultivated alongside efforts to layer a network over that bureaucracy.
- The agency offers a great deal of training, however, courses focus more on discrete, basic skills rather than on developmental programs integrated with the agency's larger strategy.
- Recruiting the right people today is one of the most important things the agency can do to prepare for the retirement wave. Reliance solely on traditional means of recruiting from the traditional sources will not produce "Multi-Faceted" people and leaves the agency ill-prepared for the future.
- The agency needs to think of and apply new forms of incentive to retain strategically selected long-time employees. Just as important will be understanding how to get the most value out of future employees who may not wish to remain at EPA for the length of their careers.



- The existing command-and-control culture needs to be transformed by overlaying the network culture of a continually learning organization. This culture change will be significant and it must be approached as a major initiative, not piecemeal. A thoughtful and powerfully effective internal communication strategy around the need for change will be critical to successfully transforming the culture.
- Vital to a culture change and internal communication campaign will be conveying to the employee population key messages about how the world is changing and what these changes mean for EPA. Communication, leadership, and adaptability have to be cultivated as highest-order values and job-specific skills. New reward systems should be put in place to encourage responsible individualism, action-orientation, and acceptance of reasonable risk. In all facets of the work environment, networking and coalition-building need to be emphasized. Diversity will remain an important value for the agency, but education and training efforts around diversity should be oriented toward why it makes sense from a business and mission-effectiveness standpoint.
- New criteria and measures of effectiveness must be developed to attract, retain, and reward those who demonstrate the multi-dimensional talents and capabilities of "Multi-Faceted" people. Hiring and promotion standards need to be adjusted to ensure that staff have the breadth of skill and an attitude of continual learning needed for rapidly evolving environmental concerns. Current criteria must be reviewed critically and measured against the understandings gained through the WAP of the potential future environment. Development of new measures and standards based on workforce requirements of the future must then be developed and implemented.
- An increasingly complex environment requires the agency to recruit and develop those who demonstrate an ability to synthesize and integrate multiple disciplines and who are continually learning and applying new knowledge. EPA must develop relationships with universities, commercial firms at the cutting edge of innovation, and others to understand what competencies enable people to succeed in these environments, and to devise ways to attract such individuals to the EPA. By doing so, the agency will improve its ability to stay on the cutting edge of communication technology and practice.



- The ability to move quickly is key. Historically, the bureaucracy has prevented the agency from moving as quickly as it needs to move.
- Self-directed teams of responsible individuals can much more effectively create effective solutions to today's environmental issues.
- With more complex types of pollution and environmental interactions, experts need to synthesize and integrate a broader body of knowledge.
- All the expertise required for every issue cannot come from within the agency. Effective networks, alliances, and "deep coalitions" will improve the agency's access to the proper knowledge at the right time--and reduce the need for the workforce to have every skill.
- Graduating to a networked management style requires sophisticated management skills, including the ability to influence productivity in a broad variety of relationships.
- Becoming more inclusive at every level can be a strategic advantage for the agency as it seeks to become more influential about environmental actions.
- With increasing modes of communication available, it is necessary to understand the characteristics of each, and to use the right combination to ensure understanding.
- Technology is bringing together new combinations of sciences, such as bio-communication, telemedicine, astrobiology,and others. Interactions of interactions become increasingly important for EPA professionals to understand and address.
- Customers play an increasingly influential role in the direction of the agency. EPA people must anticipate and respond to customer perceptions of current and future value.
- As rules and regulations become more demassified--customized or individualized, the old means of enforcement must evolve accordingly. It becomes more important to create the frameworks that enable order to emerge, rather than trying to create order itself.
- Environmental issues are increasingly interconnected and require attention at the global as well as local levels. International experience and mentoring provide critical insights.

- The single most important step EPA can take to prepare itself for its emerging operating environment is to develop a comprehensive "Workforce of the Future" strategy. The agency is obligated to think through *how* to address future challenges and *how* to recruit, develop, retain, and reward the right people to address them. Through the WAP, the agency has started making sense of the future; a strategy is a roadmap and plan for how to *act* on that sense-making.
- As it is developed, the future workforce strategic plan must be integrated with other strategic planning efforts, from the overall GPRA-required agency plan to the plans of regions, program offices, etc. Others in EPA must see successful workforce development as critical to the success of the entire agency, and they must see the workforce strategic plan as congruent with their own plans.
- Education and professional development efforts, especially at the executive level, increasingly should incorporate views, insights, and models from the world of business for operating and adding value.
- New kinds of financial and non-financial rewards need to be developed to promote effective teamwork and networking.
- Performance-based SES rotations can be an effective way to develop a broad view and to serve as opportunities and rewards for superior performance.
- Informal forums and "think-tanks," including outsiders, can enable EPA people to think creatively and network to benefit the agency and keep them enthused.
- New information and other technologies should be explored for how they can improve knowledge distribution throughout EPA. New physical layouts for workplaces can also facilitate personal interaction, teamwork, and learning.

- In a world that continues to change in unexpected directions, the EPA will also need to change and evolve in new ways. It is likely that through listening to its customers and partners, and through its more and more sophisticated ways of assessing the environment, that the agency's mission will change as well.
- Politics, science, economics, and sociology will all inevitably interact to influence the future direction of the agency. By continually evaluating and adjusting its strategies, the agency will be well-positioned to meet tomorrow's demands.

Current Workforce Assessment and Competency Gaps

Workforce Assessment Project -- Task 1

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Task 1 is organized into three major sections. Slides contain explanatory notes to expand upon the ideas presented on the slide.

The introduction places the current competency study into the context of the larger competency assessment project as well as providing information on the scope of the analysis performed for Task 1.

The section on Insights and Observations illustrates key findings of the project. Following the key findings, recommendations are made for closing gaps or expanding on current strengths. An implementation strategy is outlined to provide a time and action proposal.

Workforce competencies and gaps are described in detail in the Current Workforce Assessment section. The process used in the study is described on the Context slide. Competencies and gaps are grouped and described for each occupational group and illustrative comments are listed for the largest gaps.

The demographics section provides information about the employment environment in which EPA operates.

The Appendix contains information about the process of analyzing the verbs for alignment with the EPA mission as well as detailed descriptions of the competencies identified as required at the EPA today.

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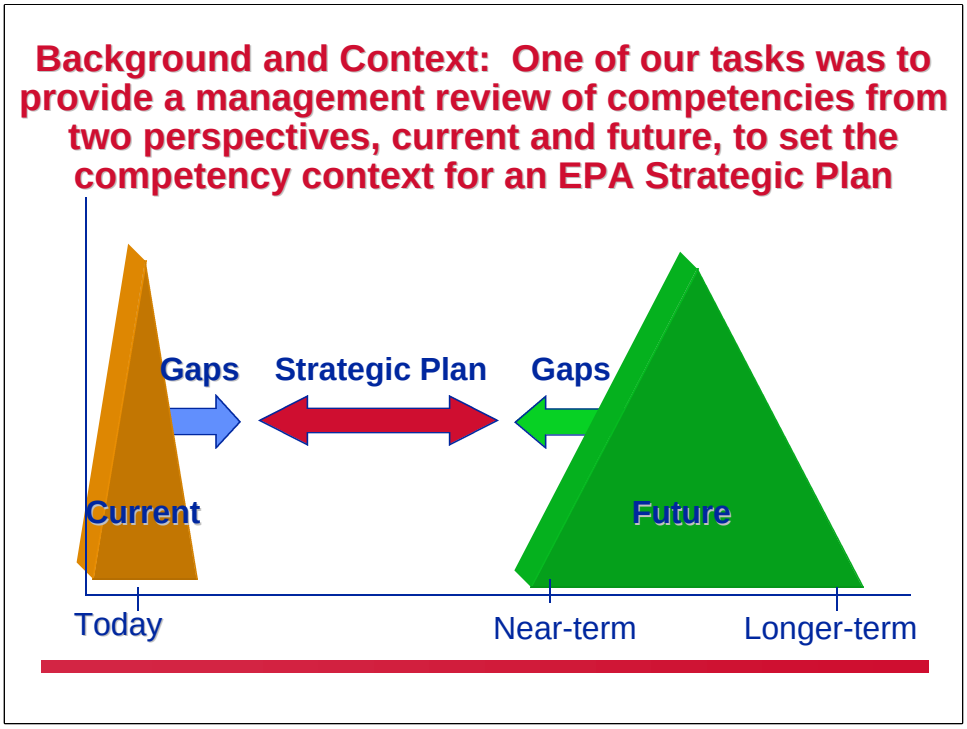
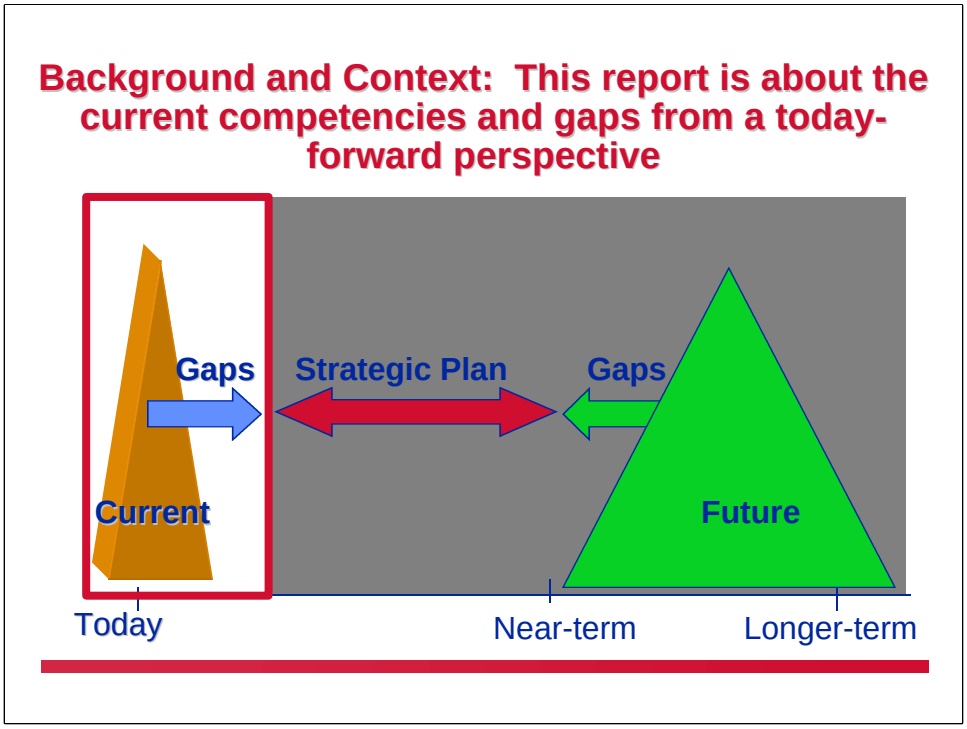
Our objective in this presentation is to highlight the current competencies that are required at EPA as well as any gaps that may hinder achievement of the agency's goals. These competencies and gaps are placed in the context of demographic information from the EPA and the U. S.



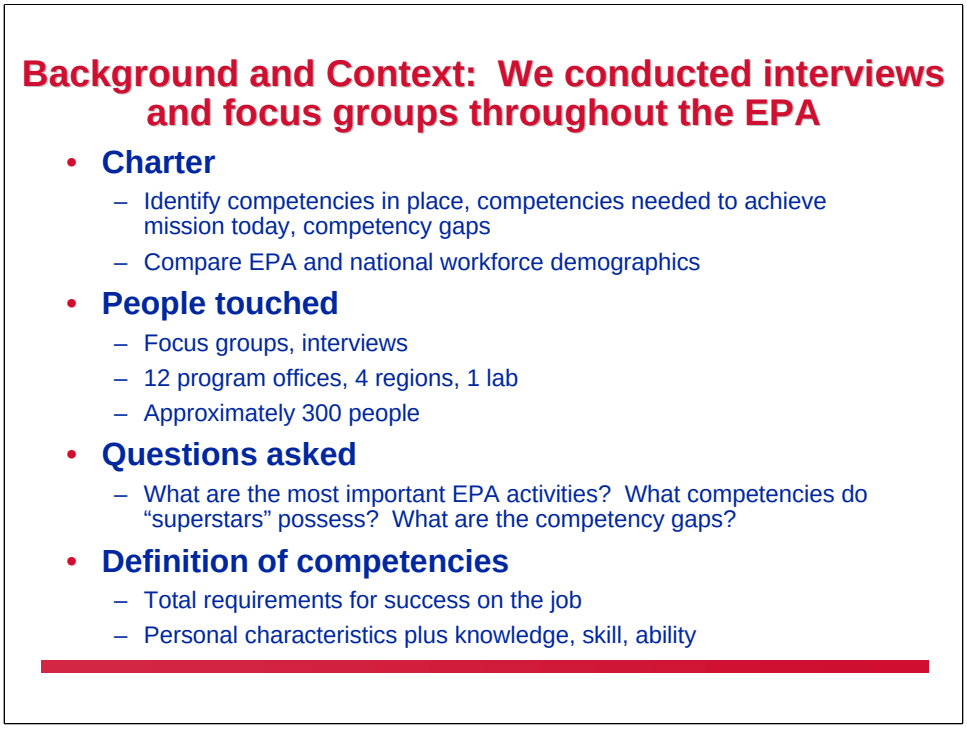
This slide provides a graphic representation of the current and future competencies portion of the Workforce Assessment Project. Task 1 assesses current workforce competencies and gaps.

Tasks 2 through 4 comprise the future-competency portion of the assessment. Task 2 describes drivers of future change for the agency and Task 3 outlines alternative future scenarios. In Task 4 we will identify potential workforce competency gaps based on the data collected in Tasks 1, 2, and 3.



In Task 1 we assess the EPA's current and required competencies. It outlines gaps between the required competencies and the level of competence currently present in the EPA. Competencies are placed in the context of U.S. and EPA demographics.

It is no longer news that today's world is changing at ever faster speeds. Business is undergoing a revolution around the globe--and new environmental impacts are discovered daily. Government organizations were developed for a world where change happens slowly--and government itself changes even more slowly. The challenge for today's leaders at the EPA is formidable. One of the fundamental responsibilities of leaders is to know their organization. The EPA asks some of these critical questions: What do we do well? What do we need to do better? The answers have to do with the relationships and obligations of the agency to its employees and the public it serves.



•EXAMPLES OF QUESTIONS ASKED

•Using verbs, what are the most important things EPA does to fulfill its responsibility?

•What is/are the most important characteristics, skills, or qualifications in the EPA workforce to enable the agency to accomplish its mission?

•What competencies are required in each occupation? Managers, Scientists & Engineers, Legal & Enforcement, Professional Administrators (Accounting, HR, Computer Specialists, Economists, Program Analyst, Budget Analyst, Contract Specialist, Public Affairs), Clerical & Technical Support

•What competencies are exhibited by the best in each occupation? Where are the significant gaps? What competencies are lacking?

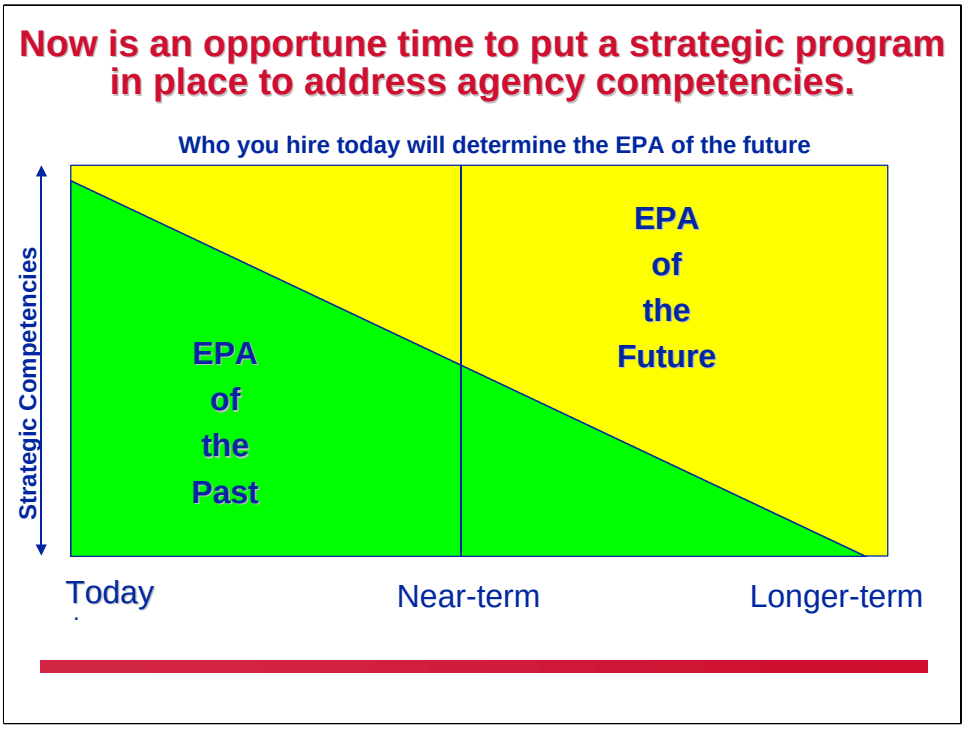
•How well prepared are job applicants and new hires for their jobs? Where are there gaps between competencies, skills, qualifications they have and those you think they need to have?

•How difficult is it for EPA to attract individuals with the right/necessary competencies skills, qualifications? What are the major impediments to attracting them?

•What is the most significant "quality of work life" issue for members of the EPA workforce?

Insights and Observations

Overview of Competencies and Gaps



Once hired, people have historically stayed at the EPA: 41% have more than 16 years service; turnover has been less than 7%. By contrast, nationally, employees stay with their employers on average less than four years.

According to EPA data, 47% of the EPA workforce will be eligible for optional or early out retirement by 2005. The management group is likely to be first to experience a large number of retirements from its ranks.

Even if all of those eligible do not retire when eligible, a major workforce change is inevitable in the near future. This demographic shift can provide the agency with an opportunity to rethink how it meets its goals. Will it replace the retirees with the same kinds of people? Different kinds? Outsource some of the work? Combine or eliminate some functions?

Consider taking advantage of the thinning ranks to bring in new people with the kinds of new competencies that the agency needs. Counterbalance the tendency to retire early with incentives to delay retirement—offered to key individuals. Take advantage of the opportunity to encourage early retirement by those who are not productive.

In any event, the leadership needs to be prepared to manage in an environment of dramatic change. And picking the right people to participate in the organization's work is a fundamental responsibility of its leaders.

EPA is a highly mission oriented organization.

- **Personal commitment to EPA's mission was nearly universal--one that most leaders would envy.**
- **However, employees expressed frustration with internal politics, congressional micromanagement.**
  - Cynicism, burnout are potential consequences of micromanagement, and internal politics--distractions from a focus on agency mission.
- **Employee commitment does not always extend to the agency itself.**
  - Rather, devotion is to environmental mission
- **This commitment can be a big plus as the agency launches potentially major organizational change initiatives.**

Employee commitment to EPA's environmental mission is a unique agency advantage and needs to be cultivated carefully. This commitment is a key factor contributing to the success of organizational change efforts.

New, environmentally focused organizations are likely to compete with EPA for this segment of the workforce that is committed to a career in environmental protection.

EPA's organizational competencies include development, implementation and administration of results-oriented programs.

- **EPA has a well-documented capacity for developing programs and solutions for issues and problems that are clearly defined.**
  - Air, rivers, lakes are cleaner.
  - Grants management, deployment of financial resources, fiduciary responsibility (e.g., Superfund) are examples of agency successes.
  - Analytical skills, program development, management skills are well developed
  - Current strengths can be adapted and applied to today's increasingly complex problems

Many of these organizational competencies can and should be applied to solving emerging environmental problems (e.g., non-point source pollution, global change, ozone depletion, etc.). Other competencies will need to be developed to meet new challenges.

These slides describe the competencies that we determined to be required for an effective EPA workforce today, based on information gathered in our interviews, focus groups, and through our analysis. The competencies are divided conceptually into four categories: personal, interpersonal, organizational knowledge, and broad-based. These competencies are described in detail in the appendix.

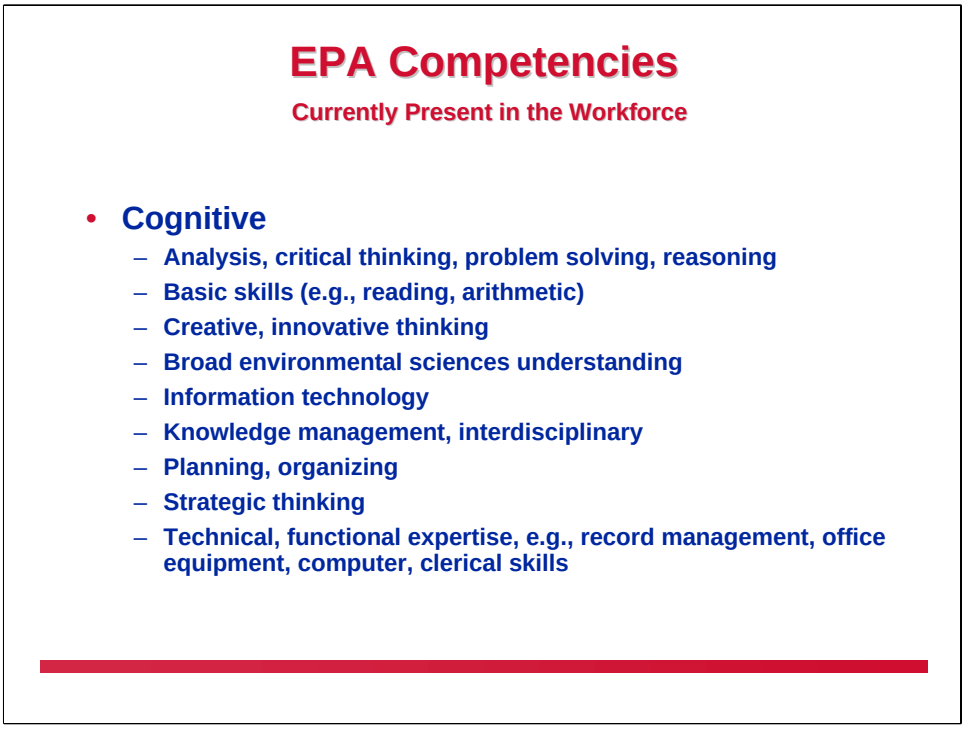
The personal competencies describe characteristics or values that enable employees to apply themselves to their work and keep up with the changes of an ever-growing body of knowledge and changing priorities.

The interpersonal competencies include those competencies that emerged as most important to EPA's workforce: communication and collaboration, including team orientation. Work at EPA increasingly depends on knowledge that is developed and shared both inside and outside of the agency. In order to share knowledge effectively, employees must be culturally sensitive (to the diverse populations at the agency and in the U.S.) and must maintain an attitude that values the employees customers (again, at the agency and in the U.S.)

Organizational knowledge emerged as a important category. These competencies relate to a mindfulness of how EPA and business organizations work. It includes employee's understanding of where the employee fits into his or her area and into the larger organization, as well as capacity to navigate the system to carry out his or her responsibilities.

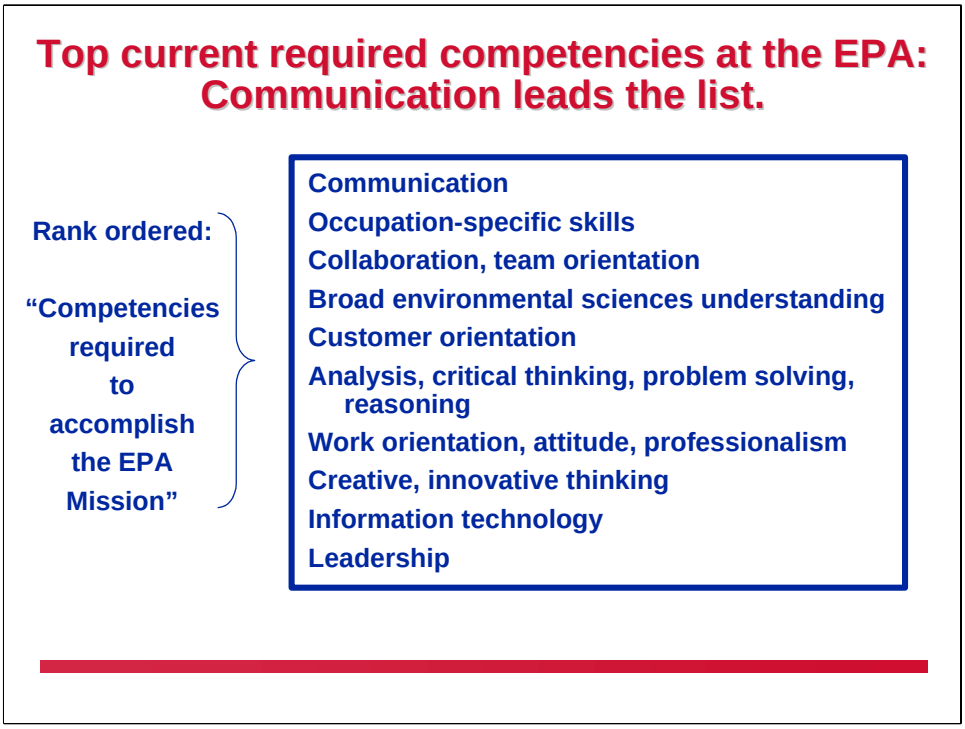
The broad-based competencies category includes leadership--not surprisingly determined to be among the most important competencies for the agency. More powerfully than written vision, mission or value statements alone, leadership sets the tone and the pace for how people work throughout the agency.

EPA, as a government agency, is organized bureaucratically and politically. Unless employees understand how to get things done and stay motivated in this setting, our analysis tells us that they will not be as effective as they could be.



With its scientific focus, the agency depends on the superior cognitive skills of its employees. The ability to see things in new ways, to critically assess the old ways, and to be able to think broadly about environmental issues, but with deep technical knowledge are some of the competencies that emerged as critical to many occupations at the agency.

In today's knowledge-based society, individuals with superior cognitive abilities are highly sought and carefully cultivated by growing numbers of organizations.



This slide shows the ten most important competencies identified by our assessment, listed in order from more to less important to the agency overall. To determine level of importance, all of the competencies described in our interviews were compiled and tallied, aggregated into similar categories, then analyzed by EPA occupational group. Of course, the number of competencies needed for different jobs, and their relative importance in each job may vary considerably.

A complete list of the EPA competencies identified in this assessment (with descriptions and examples) may be found in the appendix to this report.

Each job category had competency gaps.

Managers	–	Leadership and other management skills, as well as a broad understanding of environmental issues
Legal and Enforcement	–	Communication with non-lawyers
Scientists and Engineers	–	Communication of technical information with non-technical audience, broad (multimedia) understanding of environmental issues.
General and Administrative	–	Adaptability, communication within the agency
Office and Clerical Support	–	Although competency gaps were identified, the more significant finding is the mismatch between the current position structure and agency expectations.

The manner in which competency gaps are addressed for each group may vary depending on the type and degree of gap. Our assessment determined that although a list of agency-wide gaps was generated (see slide 40), it is as useful as examining each group individually, because the needs of each group are so different from one another. However, as described in the Insights and Observations section of this report, communication competencies were consistently was cited as needing improvement agency-wide.

Initially, the critical competencies can be developed by considering them in hiring criteria (since the agency is likely to hire a significant number of replacement staff in the near future) as well as by integrating the competencies into staff development plans, performance reviews and formal mentoring programs.

For the clerical group, competency gaps are a more result of the agency not identifying the correct skill sets required for these jobs than a failure on the part of the employees to live up to expectations. Employees are hired without the skills necessary to meet the needs of the offices to which they are assigned. The skills required need to change and current staff needs to be developed to meet the new expectations. If they are unwilling or unable to perform in the newly designed jobs, they should be moved to positions for which they are better suited.

Communication is the most critical competency shortfall.

- **Environmental issues are increasingly interdisciplinary--increasingly complex.**
- **"The public is left out too much. Misinformed. Our audience needs to understand our communications."**
- **Intra- (and inter-) agency communication and communication with the public is not sufficiently developed to convey required information.**
- **Our analysis indicates that transferring knowledge is a key part of the agency's mission.**
  - **Requires competency in communication, knowledge management, broad environmental understanding and others.**
- **Improving communication competencies would have spillover benefits for management and collaboration.**

This competency is critical if the agency's goal of expanding Americans' right to know about their environment is to be accomplished. Though we heard about employee writing abilities, at EPA the message about communication is more about the ability to convey complex ideas clearly so that the audience understands the intended message.

Communication skills are necessary for information-sharing inside and outside EPA. Communication may be improved by emphasizing collaboration, effective use of communication technologies, rotating team assignments, redesign of office and lab layouts—to maximize employee interaction. (See slides 61, 63 for more information.)

Our study found that employees recognize agency efforts to improve communication and knowledge transfer throughout the agency, however, most acknowledged that effective internal and external communication is still lacking. EPA is not alone in the dilemma of how to manage its knowledge in a way that benefits internal and external stakeholders. Effective knowledge management systems can make information more accessible to all.
New tools are being introduced almost daily to assist organizations with this problem. Choosing the right tool is a critical decision for enabling the agency to be effective in a changing environment. Three examples of knowledge management tools follow.

Abuzz Corporation's Beehive manages intellectual capital and connects people with questions to the right people with answers.

Verge Software's product enables enterprise customers to intelligently leverage corporate-wide knowledge and expertise in a project-based context.

TeamWARE Group's products offer organizations the ability to maximize understanding of unstructured information; what a business knows about itself and how it operates.

Managers do not have the skills to provide the leadership or clear strategic direction EPA needs.

- Basic occupational skills were the most frequently cited managerial competency gaps.
- We heard that managers do not exhibit risk-taking capabilities necessary for an increasingly uncertain decision environment.
- In these times of accelerating change, the agency needs leaders who can manage boldly and decisively; who encourage employees to take calculated risks.
- Managers are often promoted from science and engineering ranks without a coordinated management development plan to ensure their effectiveness. They often have not had an opportunity to develop managerial skills.

For managers, basic occupational skills include things like leadership, management, and supervisory skills.

Today's environmental issues are more diffuse and uncertain: More companies are being formed, more products being created, more interactions and long-term environmental and health consequences are being discovered. This kind of environment requires sharper cognitive skills--the ability to look at the holistic view as well as the component parts of a problem to understand them better. It also requires that managers be competent in leading organizational change.

Training in stand-alone programs is not sufficient. Programs that are well coordinated to provide comprehensive employee development and meet specific job requirements can be effective in closing this gap.

To prepare for the likelihood of a large management retirement exodus, hiring more professional managers from outside EPA, e.g., from business schools or from the regulated community can be an effective approach.

Recognize that more mistakes are likely during periods of greater uncertainty and reward employees for prudent risk-taking, in spite of occasional failure.

Newer employees at EPA are not sufficiently developed for future management responsibilities.

- Data from our interviews indicate that management's role is changing rapidly.
- Management development programs need to be forward-looking and develop leadership competencies to meet strategic goals for a dramatically different future EPA environment.
- Formal leadership, mentoring, coaching programs, and a comprehensive, coordinated management development program can provide needed competencies to new managers and provide opportunity for current managers to develop needed skills. These programs can be a useful for keeping people challenged and engaged agency-wide.

Current training programs tend to be tactically oriented. They teach practical skills, which are important, but alone, are not sufficient. Skills like writing, speaking, using office equipment, etc. should all be required for employment in professional level jobs. EPA can add value by providing the leadership development support that employees need to help the agency achieve its mission.

This critical issue demands immediate attention because of the impending departure of many of the most seasoned managers. The agency should focus on hiring people with the practical skills and then provide mentors and development to help them accomplish EPA's mission.

The newly flattened organization has not worked well because employees do not know how to get work done in the new structure.

- There were frequent complaints about the effectiveness of the change--the implementation may need more attention.
- No one reported being aware of a coordinated change management program to provide employees with the new competencies needed. There was a surprising lack of reports that the transition was successful.
- A flatter organization has the potential to help streamline the agency.
- The way that work is done and information is communicated needs to change for the new flatter organization to realize its potential.

This flatter organization is fundamentally different from the old command and control hierarchy. It pushes authority and responsibility up to managers and down to employees. It requires trust on the part of managers and capable, empowered employees. It requires new ways of communicating and collaborating and provides an ideal opportunity to develop multidisciplinary, self-managing teams. Our assessment of EPA's issues indicates that as environmental problems become more multi-media, this approach becomes a key to success. EPA employees have not yet learned these new competencies.

The new structure shortens the distance that information has to travel up and down within the organization and therefore has the potential to expedite communication.

The flatter structure means that the way that work is done and information is communicated needs to change for the new flatter organization to realize its potential. Employees need a better understanding of their new responsibilities. Leadership by example of how to work in the new structure can improve effectiveness.

Roles and responsibilities of secretarial staff have not been restructured in line with today's changed work environment and the agency's needs.

- Administrative support staff does not have the competencies the agency needs today. This mismatch can result in major employee problems.
- A new mutual understanding of the roles and competencies for this group must be developed. The new understanding must begin with recognition that the old role no longer exists.
  - Management and unions can work together to develop mutually useful solutions.
- Any solution should provide the necessary staff development and provide for hiring new staff with appropriate skills.

Support staff may possess the requirements stated on job descriptions, however, the jobs need to be restructured to meet the needs of today's office work. There is less need for fast typing, filing and telephone answering, and more need for understanding and communicating complex office systems and agency problems.

Every office needs an administrative manager who can perform complex scheduling and office resource allocation tasks, answer questions about office software and hardware, perform office-related research and draft correspondence. The office skills required today are considerably more complex than those required only a few years ago. Hiring practices need to change accordingly.

Successfully recruiting the right people in the near future will become a critical issue, particularly in the science and engineering areas.

- Nearly all interviewees familiar with recruiting noted the ease with which they were able to find good staff today--minor exceptions were in the science and engineering areas.
- However, employees with technical qualifications are becoming harder to find. Competition in the market for technically skilled workers is projected to escalate rapidly.
- It will be more important to identify innovative means of attracting and retaining qualified employees.
  - Promote awareness of most attractive EPA work attributes.
  - Customize compensation and benefits.
  - Novel professional development programs.

Our review indicates that EPA relies on established procedures for recruiting new employees--to date, the agency's mission has been sufficient to attract high-quality applicants. As competition for technically qualified employees grows, it will be important to find new ways to attract the best and brightest.

Professional development programs can help attract and keep the agency's best. Some of the things that can be done to support professional development include:
-technical training and education
-encouragement, recognition, and reward of scholarly research and publishing.

Scientists and engineers who are good at what they do should not be forced into management as a way to increase salary and stature in the agency. Managers who understand the unique requirements of the science and engineering professions can be recruited from outside the agency.

The scientists and engineers are competent at their disciplines. The ability to integrate cross-disciplinary solutions is less well-developed.

- Interviews tell us that environmental issues increasingly require both breadth and depth.
- "It's less important to have specialists at EPA. EPA needs to understand the big issues, and needs people who can integrate. Our current focus is too narrow."
- New management approaches can facilitate the development of multidisciplinary, self-managing teams.
- It may be necessary for EPA to rely on outside (university or corporate) research expertise for more of its fundamental and cutting-edge science.

Multidisciplinary teams can bring novel approaches to environmental problems. They can address multi-media problems in a more holistic way. This kind of approach should be encouraged and rewarded.

Managing the creative geniuses in the science and technical professions is an especially challenging task requiring unique talents and abilities. Here, manager and subordinate must work collaboratively. An atmosphere of mutual respect needs to be fostered and maintained.

Scientists and engineers tend to work more on the reactive and near-term than proactive and strategic.

- We hear that scientists tend to apply expertise to areas where they know they have been effective, often with diminishing returns.
  - "The next level of clean is very expensive."
- Groundbreaking work in new areas where successes are less certain and tangible may provide bigger payoffs.
  - However, the system does not encourage and reward breaking new ground on new environmental issues.
- Rewarding development of new projects and encouraging risk-taking can help shift the focus in a more strategic direction.

The opportunity to work on novel issues can be an effective tool for recruiting and retention. The environment will benefit while employees face new and energizing challenges.

Apply the lessons learned from these successes to the new, less clearly defined environmental issues.

Communicate and educate internally and externally so that agency priorities and efforts are aligned with real environment risks and potential for improvement.

New workers are less likely to spend an entire career at EPA because of growing competition.

- There was agreement among interviewees that professional development opportunities at EPA are not sufficient.
- Other organizations will provide increasingly attractive work arrangements and compensation packages.
- The GS schedule allows little flexibility in employee pay.
- The hiring process is protracted and good people are not always willing to wait as long as it takes to be hired.
- In recruiting, EPA has succeeded by relying on its mission to attract candidates. We believe this is no longer enough. The agency will soon need to become more creative to attract and retain the right people.

More and more organizations also provide jobs where workers can make a contribution to environmental concerns. EPA competes with a growing number of employers worldwide for an elite group of knowledge workers.

Some of the key factors contributing to employee satisfaction--and retention--are the opportunity to learn new skills; coaching and feedback from the boss; the type of work done; ability of top management; recognition for a job well done; respectful treatment; training; and pay.

Employees are almost universally pleased with the quality of work life at EPA.

- There was widespread agreement among those interviewed that EPA provides a positive working environment.
- However, interviewees frequently commented on management's lack of leadership abilities.
- One of the only concerns raised about the quality of work life is a desire for development of a telecommuting program or provision for other types of off-site work.
- EPA's quality of work life is a unique agency advantage if it is use it to attract and keep EPA's best and brightest.

Cultivating a positive quality of work life can result in higher motivation and productivity and can be a key agency advantage in tight labor markets.

Employees are extremely interested in telecommuting when possible, either at home or in a satellite office. Agency efforts to accommodate this desire will help to ensure that the agency does not lose the employees who would seek other employment to avoid a difficult commute.

Failure to deal with nonproductive employees has caused pockets of poor morale.

- Many interviewees suggested that EPA should be more like business in getting rid of employees who are not productive.
- Lack of union cooperation and lack of management support were frequently cited obstacles.
- Effective means for dealing with nonproductive employees are not apparent. Agency can't afford the productivity drain. Poor morale lowers productivity.
- Supervisors do not have clear, enforceable standards with which to develop or move out poor performers.
  - Obtain cooperation of unions as necessary through communication, and collaboration on the standards.

Managers often ignore employee performance problems because they feel their efforts are often futile. Reports of allowing nonproductive employees to stay in their jobs unchallenged were common. A nonperforming employee can negatively affect the work environment for many employees in the work area causing widespread productivity and morale problems.

As the turnover rate increases and nonproductive employees leave, managers need to be vigilant not to allow similar behavior to develop in new employees.

The most effective employees have highly developed abilities to deal with the political, bureaucratized environment

- Interviewees frequently commented on the highly political (and sometimes unfair) way many decisions are made at every level of the agency.
  - Micromanagement by Congress is another source of distraction.
- The ability to cope with the internal political process and oversight is an important competency in the agency.
  - Those who are most successful find ways to work around the rules and bureaucratic roadblocks to achieve a greater public good.
- Acknowledging, embracing, and cultivating these abilities can be beneficial to the agency.

Perceptions of unfairness can be resolved by encouraging leadership as described earlier. The politics and Congressional influences are a fact of life today and it is important to find ways to be productive in this environment.

These slides provide guidelines for carrying out a competency development effort at the EPA. The recommendations follow two principal themes. First, is an organizational development approach. If the agency can integrate an awareness of those needs into not only its policies and procedures, but into the way people work with one another and share their knowledge day to day, the effort becomes self-sustaining. When people take charge of their own learning, they tend to be more committed to it--and it increases motivation and loyalty.

The second theme considers the recruiting, hiring, and employment aspects. With an unprecedented influx of new employees facing the agency, it is critical that the EPA ensure that those entering the agency have the right competencies.

With respect to appealing to employees' love of the agency's mission, this is a tremendous starting point for the EPA. Though without additional changes, it is not sufficient to serve as a means of attracting and retaining the staff that the agency needs.

Change efforts, like the EPA's effort to ensure that its employees have the kinds of competencies it needs to meet today's and tomorrow's challenges, must consider the range of organizational realities. Political factors affect the dynamics of every group in every organization--how the members relate to one another as they accomplish their work. Of course the rational aspect means that change efforts need to make fundamental sense to the people who are affected. And on the gut level, the emotional level, people need to believe that the change is necessary.

The importance of integrating the agency's current training efforts (and supplementing them with developmental or rotating assignments) into a coordinated competency development effort cannot be stressed enough. The agency should strive to hire people with necessary basic skills, then provide developmental support to enable them to be effective in EPA's unique environment.

Recommendations

Specific actions for improving agency competencies

- **Organizational development**
  - Implement a comprehensive, agency-wide policy on individual performance standards--tied to GPRA. Support it with a management development program that provides managers with strong supervisory skills.
  - Educate unions on new issues facing the agency and develop partnership through improved communication and collaboration to resolve them in the interest of the environment.
  - Formal leadership, mentoring, coaching, management development programs can provide needed competencies to new and current managers when integrated into a strategic development effort. They can also be effective retention tools.
  - Recognize & encourage employee abilities to be productive in a bureaucratic/political setting.
  - Apply management competency lessons (e.g., program & regulatory development skills, financial/fiduciary management skills, etc.) learned from successful programs to new, less clearly defined environmental challenges.

Performance standards, designed to develop the individual competencies can be a useful way to drive responsibility for meeting the standards down to the employee level.

In these times of rapid change, a working agency-union partnership is essential to educate them on the agency's strategic direction and its implications for workforce competencies--as well as an opportunity to learn about union membership concerns.

Formal mentoring programs, unlike the often unpredictable mentor relationships of the past, have proven to be highly effective at developing leaders by ensuring that both parties have clear understandings of their roles and responsibilities and by following up to ensure that both parties benefit. Formal programs provide mentoring opportunities to a wider range of employees

A political bureaucracy is a fact of government life. Not surprisingly, we found that those who thrive in it are the most successful. Reward systems can encourage people to develop this competency.

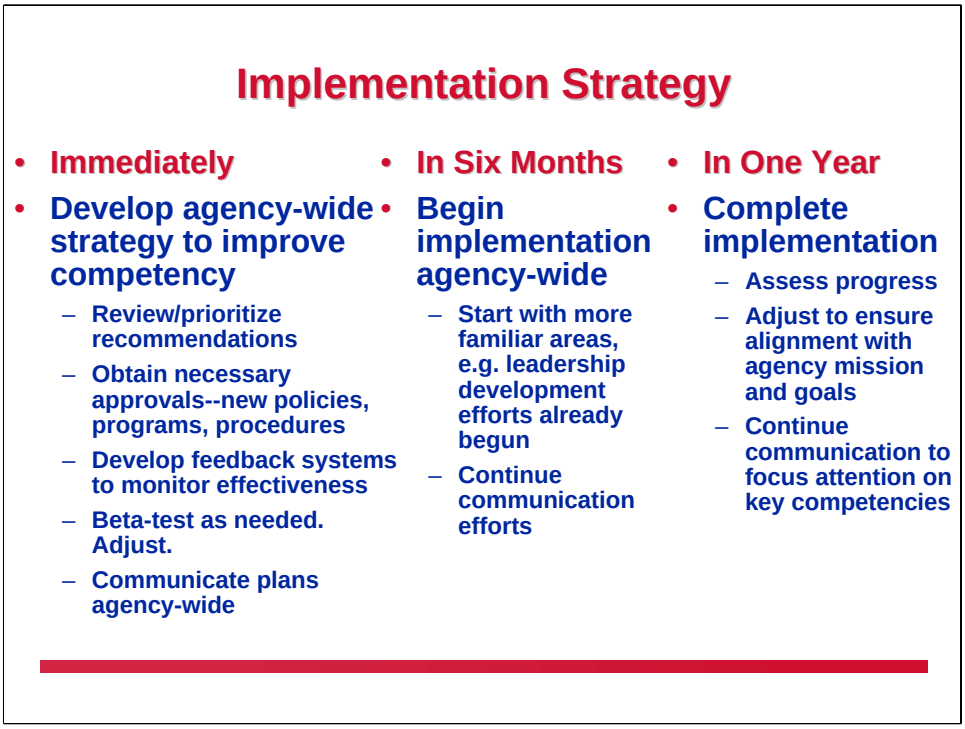
As managers deal with novel issues they will be forced to take calculated risks. Risk-taking by managers should be encouraged and rewarded.

Actively managing the "retirement bulge" is a key to minimizing the potentially devastating effects of the largest exodus in the agency's history. Encourage early retirement for nonproductive employees to permit hiring and promotion of more effective staff. Implement alternative work arrangements such as part-time, job-sharing, telecommuting, etc. to take advantage of the talents of additional skilled people.

To replenish and even supplement competencies lost to retirement, the agency should find a way to attract talent from leading-edge companies to boost creativity and a sense of urgency among employees.

Initiatives to attract and keep key employees should appeal to their commitment to the environment and show how the effort benefits strategic environmental goals. The environmental focus must be coupled with a good working environment, the opportunity to do interesting work and competitive salaries. DOL statistics find that federal salaries average approximately 30% behind the private sector.

An increased emphasis placed on specialized outside recruiting would be beneficial because although it is not currently something the agency relies on, it is likely to become an important component of agency staffing plans--and it is the only way to achieve the necessary levels of diversity. The key is to remain an employer of choice as job candidates have more options from which to choose--more employers who offer an opportunity to contribute to an environmentally focused goal.



EPA human resource officials should prioritize the recommendations in this report. Some of the recommendations may require special approvals or further development before they can be tested. Those recommendations are easier to implement can be tested first while work on the more involved areas proceeds.

Leadership development is the key to developing the other competencies. Leaders need to start organization-wide conversations, stimulate debate, provoke argument, create a healthy tension. By deeply involving the entire agency in carrying out its vision, it harnesses the collective brainpower of the whole workforce. Management development efforts should encourage, recognize, reward management initiative so that managers take charge of their own career development. Throughout the effort, employees should be encouraged to take responsibility for their own competency development--and rewarded for it.

Solutions to problems as diverse as office support and global change can be addressed through this kind of broad, honest dialogue.

Employee communication competencies and needs vary from group to group and from individual to individual. However, the most consistent gap was the ability to communicate technical information to non-technical people.

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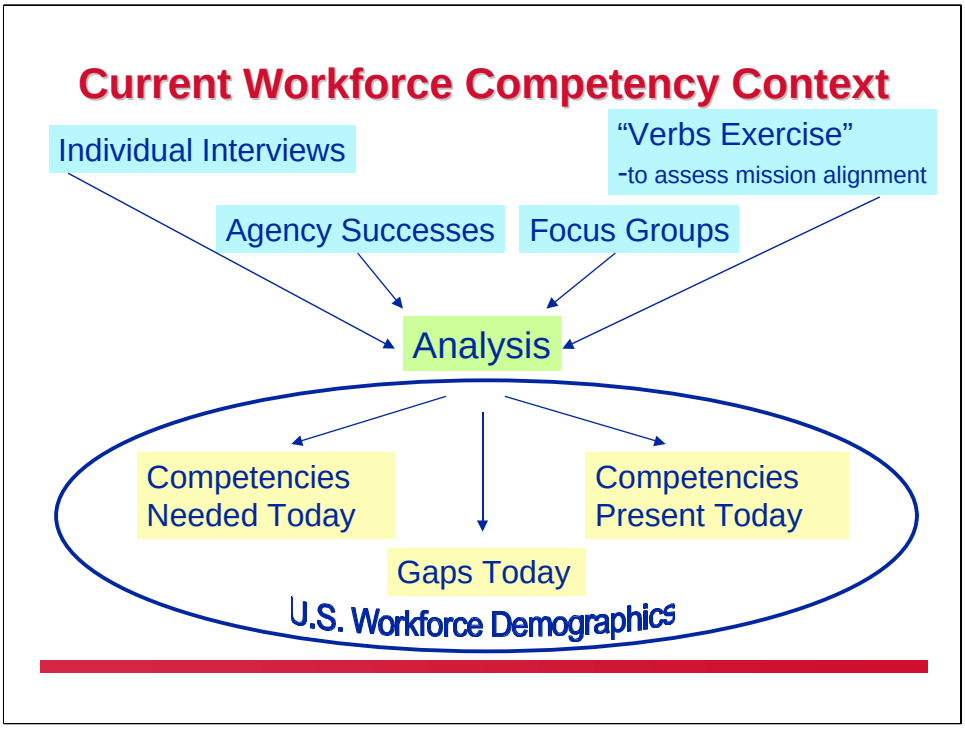
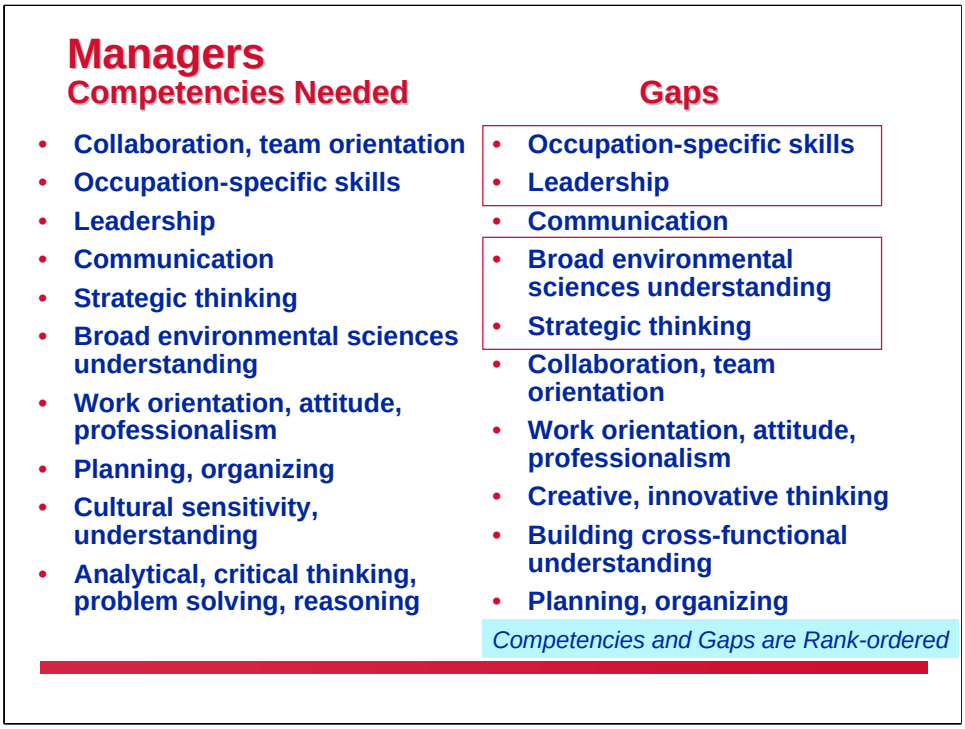
UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
Current Workforce Assessment
The Process, The Competencies, The Gaps



This slide provides a schematic of the inputs and outputs of the current competency assessment. In addition to the individual interviews and focus groups, we considered information on agency successes and asked interviewees about the most important activities of the agency--using verbs. All of the analysis was performed recognizing the issues and trends occurring today in the U.S. workforce that will have an effect on the EPA (e.g., changing nature of work, aging of the workforce, growing or shrinking occupations, retirement age, etc.).

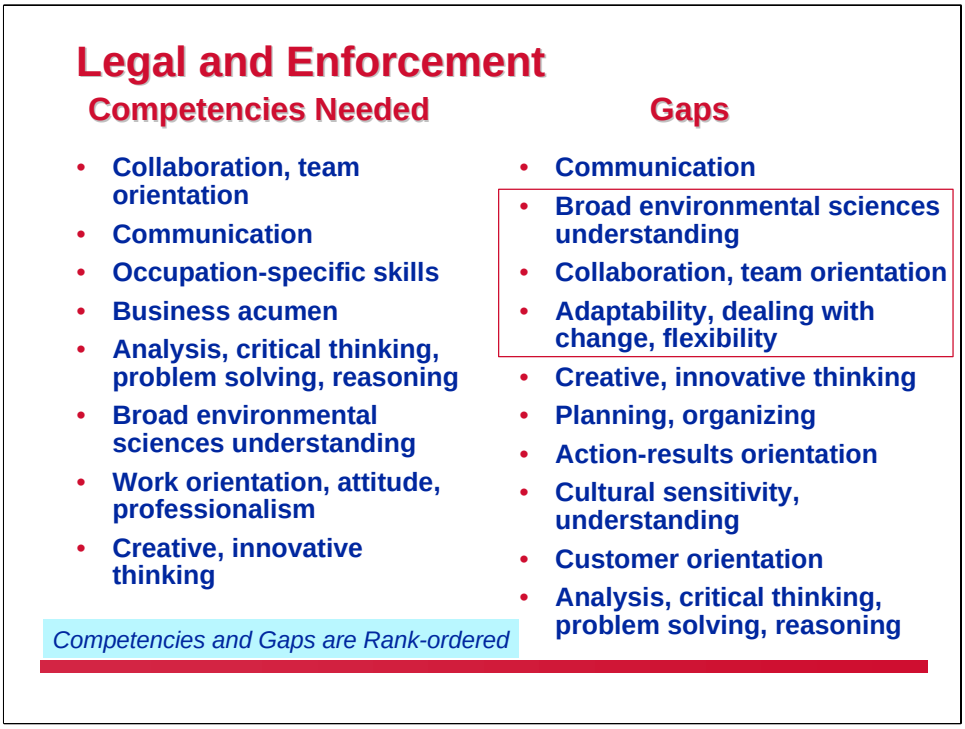
The analysis identified competencies and gaps for the agency which are described in this report. With this information about the competencies of its employees, the agency can devote its attention to building on its strengths and shoring up areas that require additional attention.



The basic competencies that managers at the EPA need today are shown here in the first column. The second column indicates which competencies tend to be lacking among managers. Competencies and gaps are shown in generally decreasing order of importance, based on the data obtained in the focus groups and interviews.

In the management gaps column, occupation-specific skills can be combined with leadership as the most important competency, since leadership is a required component of many management jobs. Need for broad environmental sciences understanding, and strategic thinking are shown to be of equal importance.

For full descriptions and examples of these and all of the competencies identified at the agency, please refer to the Appendix at the end of this section of the report.

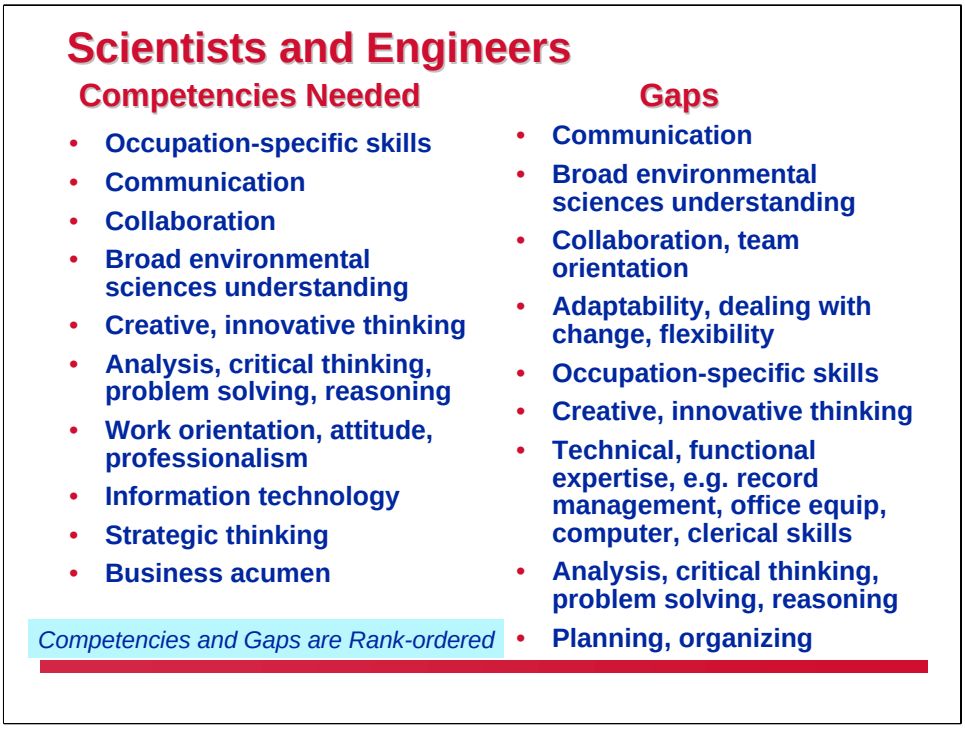


The basic competencies that legal and enforcement employees at the EPA need today are shown here in the first column. The second column indicates which competencies tend to be lacking in the group overall. Competencies and gaps are shown in generally decreasing order of importance, based on the data obtained in the focus groups and interviews.

For this group, the communication competency refers specifically to the ability to relate legal concepts to people who may not be familiar with legal concepts, orally, in presentations and in writing. Competency gaps among broad environmental sciences understanding; collaboration, team orientation; and adaptability, dealing with change, flexibility were all determined to be of equal importance.

Overall, this group is perceived by the EPA workforce to be highly competent in legal matters.

For full descriptions and examples of these and all of the competencies identified at the agency, please refer to the Appendix at the end of this section of the report.



The basic competencies that science and engineering employees at the EPA need today are shown here in the first column. The second column indicates which competencies tend to be lacking among members of the group today. Competencies and gaps are shown in generally decreasing order of importance, based on the data obtained in the focus groups and interviews.

The lack of professional development opportunities and the rigid compensation structure were indicated by interviewees as factors that limit the agency's ability to attract and keep the best candidates.

For full descriptions and examples of these and all of the competencies identified at the agency, please refer to the Appendix at the end of this section of the report.

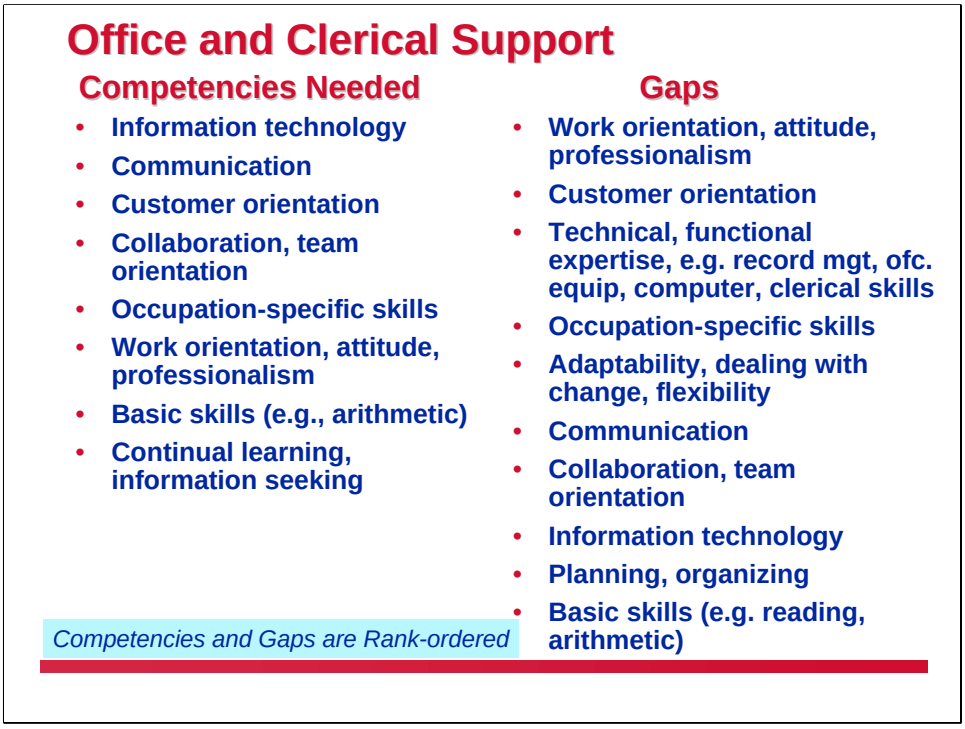
This group includes accountants, human resources occupations, computer specialists, economists, program managers, program analysts, budget analysts, contract specialists, public affairs, etc.

The basic competencies that administrative professionals at the EPA need today are shown in the first column. The second column indicates which competencies tend to be lacking among members of the group today. Competencies and gaps are shown in generally decreasing order of importance, based on the data obtained in the focus groups and interviews.

The red boxes indicate those gaps which were determined to be of comparable importance. Adaptability, dealing with change, flexibility and communication were viewed as the most important gaps; broad environmental sciences understanding and customer orientation were less significant gaps; and collaboration, team orientation was cited at the same level as competence in information technology.

A number of our interviewees noted improving service levels received from the members of this group in the recent past.

For full descriptions and examples of these and all of the competencies identified at the agency, please refer to the Appendix at the end of this section of the report.



The basic competencies that secretarial, clerical and technical support employees at the EPA need today are shown in the first column. The second column indicates which competencies tend to be lacking among members of the group today. Competencies and gaps are shown in generally decreasing order of importance, based on the data obtained in the focus groups and interviews.

The gaps for this group are more a function of the way the agency structures the jobs. On-the-job requirements are more complex and more knowledge-based than formal (or traditional) role descriptions.

As noted in the conclusions part of this report, the EPA needs to devote serious consideration to developing this group into one that can provide the kind of support that the agency needs today. Many members of this group are hired for a kind of work that has all but disappeared from today's workplace. Many employees in these jobs realize that their skills are not needed and therefore become demoralized because they are unable to contribute to the agency's success.

As shown in the first column, today's office support staff at EPA needs to be well versed in the office technology currently in use and needs to be able to quickly learn new technology as it is introduced. It is critical that they can communicate EPA's business clearly, often on behalf of supervisors and managers, to individuals and groups inside and outside the agency. To do this they need to understand the business of the office in which they work as well as that of the agency. They are often expected to trouble-shoot problems or to train new staff on the fundamentals of the office technology.

For full descriptions and examples of these and all of the competencies identified at the agency, please refer to the Appendix at the end of this section of the report.

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Gaps Summary

Representative Comments

Competency Gaps

- **Communication**
- **Broad environmental sciences understanding**
- **Collaboration, team orientation**
- **Adaptability, dealing with change, flexibility**
- **Planning, organizing**

This slide describes the competency gaps that arose most frequently in each category as determined by our interviews and analysis. Each occupational group may have different requirements and gaps--these gaps will not apply to the entire workforce. These gaps are the “big picture” concepts--other gaps may also be important to individual areas of the agency. The following three slides provide illustrative comments on each of the gaps listed here.

On Communication Gaps….

- *"The public is left out too much. Misinformed. Our communications need to be understood by our audience."*
- *"Our regulations need to be easier to understand…and we need to be able to speak to the people in the communities about regulations in language that they understand. We don't do this very well now."*

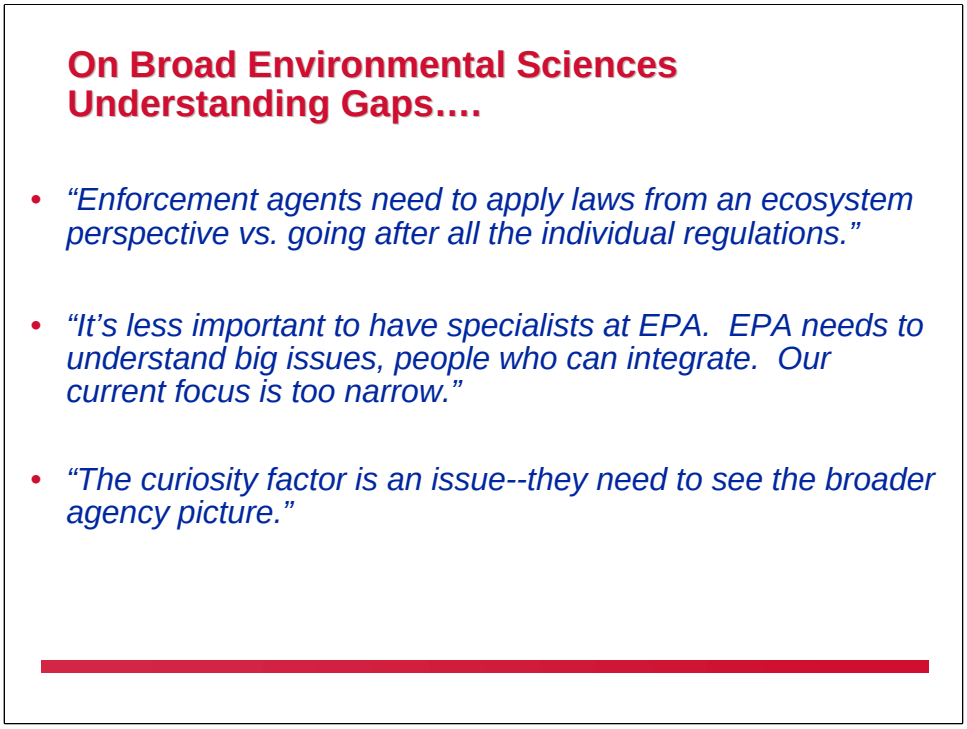
On Collaboration, Team Orientation Gaps….

- ***"**We need the vision to be willing to listen to other points of view and integrate them into a solution."*
- *"We tend to protect ourselves….and not reach out. We are kind of paranoid, but we need to deal with it and not develop a siege mentality."*

There was clear consensus that communication requires attention. For the managers, legal, enforcement, science and engineering groups, emphasis was on communicating complex information in language that can be understood by the audience rather than in professional jargon. Today's environment requires that all communicators understand their audiences and target their messages.

"Communication" includes oral, written, and electronic communication whether one-on-one or in groups--internally as well as externally. Communicating well in teams requires special collaboration and relationship skills to ensure that the message was understood as intended.

Diversity in the workforce in combination with effective collaboration can improve communication and problem solving externally as well as internally. With a diverse workforce, multiple views, methods of reasoning, and approaches to communication can be applied to arrive at solutions that may not have been possible otherwise.



One of the top comments was the opinion that throughout the agency, employees needed a systems view of how what they do fits into the larger perspective of the agency and its mission. They noted that people need to be competent at a range of things. While people may be specialists at one thing, they need a clear picture of how that specialty is affected by and affects the environmental goals of the agency. Most interviewees felt that the agency needed to place greater emphasis on achieving a broader understanding of environmental issues.

On Planning, Organizing Gaps….

- *"We cobble together programs, but you can't have a great impact with short-term programs."*
- *"Things are always done incrementally here, we should be thinking in a more integrated fashion."*

On Adaptability, Dealing with Change, Flexibility Gaps….

- *"We're weak at the socio-political stuff. We need to know how to use the system to understand and change behavior."*
- *"Our biggest challenge is that the agency and our mission are changing; we need to value individual uniqueness."*

We heard that environmental projects often do not relate well with one another and that project priorities don't correlate well with actual degree of risk to the environment or human health. Better communication and decision-
making systems may help to resolve this issue.

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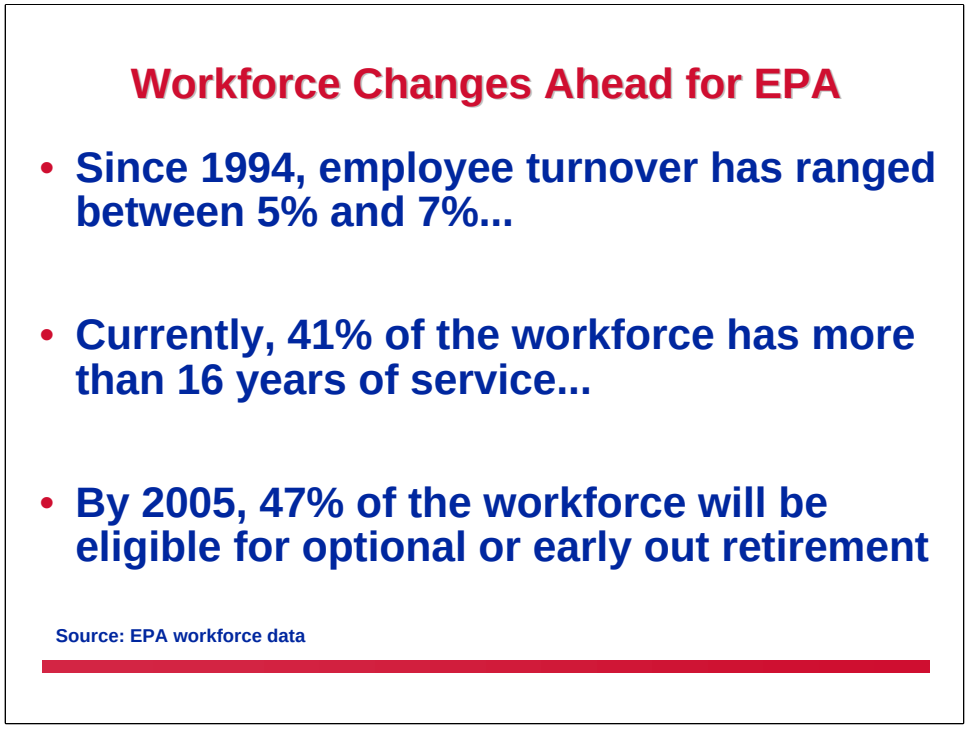
Demographics

EPA and U. S.

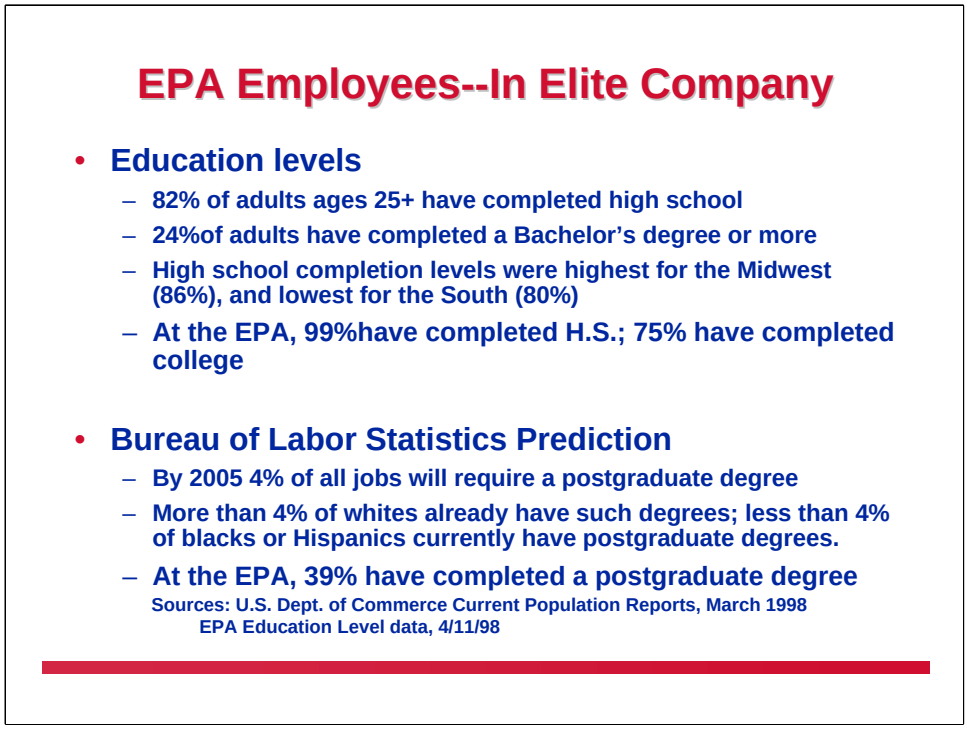


There did not seem to be a great deal of recognition of the magnitude of the change that the agency will face as its more senior employees retire. As discussed earlier, increasing departures from the EPA workplace are inevitable, the question is when they will occur.

Nationally, the age at which employees retire is influenced by factors such as Social Security benefit levels, and pension, retirement or other benefit plans. A national trend toward less enticing benefits has encouraged later retirement. With future Social Security benefit reductions possible, it is reasonable to expect that Americans will decide to delay retirement beyond today's levels.

According to Bureau of Labor statistics, in 1995 72% of men over 65 with less than a high school education remained in the workforce, while nearly 94% of men with four or more years of college remained in the workforce after age 65. Those with higher education levels tend to hold white-collar (presumably less tedious or exhausting) jobs.

The Bureau of Labor statistics reports that in 1995 approximately 9% of women 65 and older were in the U.S. labor force. For men 65 and older, approximately 18% were in the labor force. This compares to rates of about 50% of women 55-64 and 66% of men 55-64 who are in the workforce.



EPA competes for the best and brightest segment of the nation's workforce. Competition for this tiny segment is bound to increase dramatically in the near term. The agency has not had to do a great deal of recruitment in recent years because people have tended to remain with the agency for their entire careers.

The need for greater numbers of highly educated and skilled employees to replace those retiring will place strain on the recruiting function as well as on specialty areas within the agency, where it may be difficult to attract people with the right mix of skills. Improving workforce diversity now will improve the agency's attractiveness as an employer to a broader range of job candidates--a definite plus in a tough labor market.

Growing Demand for High-Level Skills

- **Selection of fastest growing occupations 1994-2005**
  - Systems analysts (118% growth between 1994 and 2005)
  - Computer engineers (91% growth between 1994 and 2005)
  - All other computer scientists (90% growth between 1994 and 2005)
  - Paralegals (50% growth between 1994 and 2005)
  - Management analysts (35% growth between 1994 and 2005)
- **Selection of fastest shrinking occupations 1994-2005**
  - Computer operators (-37%fewer jobs between 1994 and 2005)
  - File clerks (-15% fewer jobs between 1994 and 2005)
  - Mail clerks (-9% fewer jobs between 1994 and 2005)
  - Bookkeeping & accounting clerks (-8% fewer jobs between 1994 and 2005)
  - Payroll & timekeeping clerks (-8% fewer jobs between 1994 and 2005)
  - All other clerical workers (-3% fewer jobs between 1994 and 2005)

Source: Bureau of Labor Statistics, *Workforce 2020, Hudson Institute*

The demand for highly skilled knowledge workers grows steadily while the need for less skilled work of all types decreases. The EPA depends almost entirely on knowledge workers--the area that is experiencing the most rapid growth in the U.S. job market.

Like the country at large, the EPA also is experiencing a decline in demand for employees who do primarily clerical work. There is a significant impact on the agency's clerical staff who find their skills becoming increasingly obsolete.

A Battle for Executive Talent

- **Many companies today report shortages of executive talent--at the same time, search firm revenues have outpaced GDP 2 to 1 over the past five years.**
- **Historically, the population of executives has kept pace with the GDP** (Gross Domestic Product)**.**
- **Assuming a 2% growth rate for the next 15 years, the demand for executives should increase by about 30%.**
- **Executive supply, however, is shrinking. The number of 35-44 year olds will decline by 15% by 2015.**

Source: McKinsey and Co., 1998

With a diminishing supply, and no new sources of executive talent emerging to reverse the trend, (e.g. the rate at which women entering the workforce has stabilized, immigration is stable, people are not prolonging their careers) competition for executives is projected to escalate rapidly.

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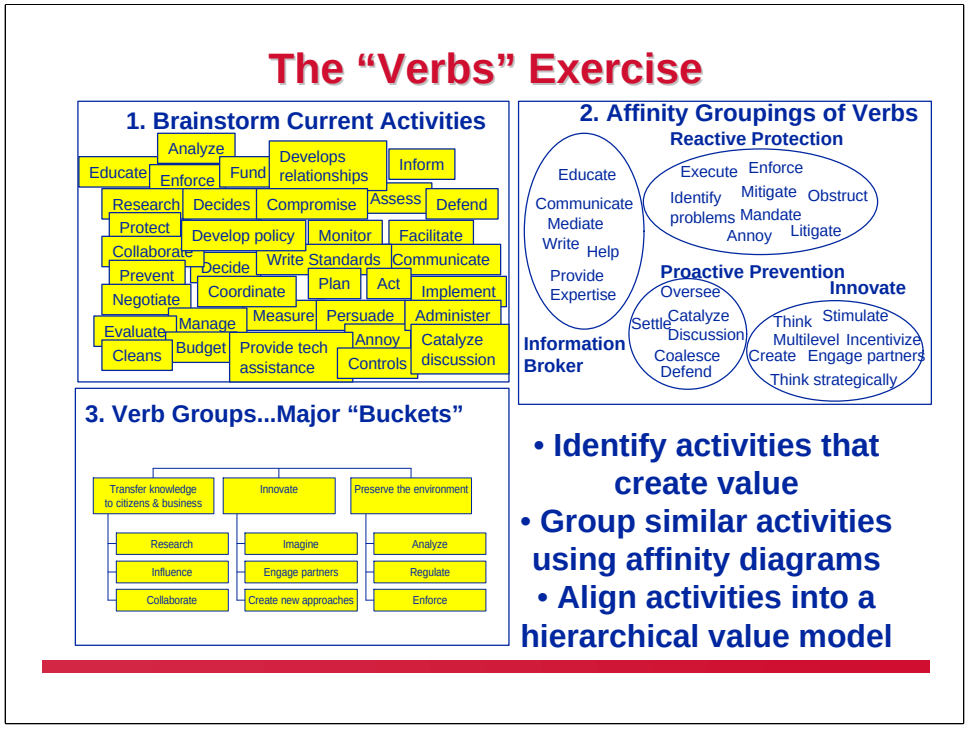
Appendix



In this part of our assessment we determine what are the most important agency activities and whether the agency is achieving its goals through those activities. As part of the interview process we asked what were the most important activities for EPA to carry out its mission. We asked for these activities in verb form in order to eliminate buzzwords. This process also allows us to compare what activities the employees feel are actually being done to those required by the organization's mission. (The verbs identified in the interviews are listed in the appendix, with an indication of the number of times that they occurred.) The interviews have the potential to identify any disconnects between the organization and the senior leadership about the organization's functions that create value for the agency and its public.

After all of the verbs were collected, we grouped them into successively smaller groups that were linked by a similar concept. We reduced the groups, using affinity diagrams, until we had three categories that were mutually exclusive and collectively exhaustive. That is, each group was fairly different from the others and together, they describe the activities of the agency fairly completely.

The technique used here is derived from a Toffler Associates tool called "Future Value Analysis" where the creative process is used to identify high-value opportunities and improve strategic decision-making. The technique identifies initial as well as new (potentially better) alternatives so that they can be evaluated against the organization's goals and values.

[Future Value Analysis has been used in complex decision environments including how to best apply a CERCLA- (Comprehensive Environmental Response Compensation Liability Act) based decision and risk analysis for a government customer to evaluate existing and innovative remedial alternatives.]

These four slides show the verbs that were used to describe the most important agency activities. Numbers following some of the verbs indicate the number of times that the verb was mentioned. The verbs were aggregated using affinity diagrams--into successively larger groups to arrive at the three high level categories of “transfer knowledge”, “innovate”, and “preserve the environment”.

Verbs Describing Most Important EPA Activities

- Be concerned
- Develops relationships
- Engage partners
- Help
- Compromises
- Networks
- Understands
- Reach out
- Build consensus
- Be responsive
- Increase diversity
- Recommend
- Listen
- Represent U.S. in Int'l forums
- Integrates
- Convenes
- Delegates
- Be proactive
- Conduct dialogue
- Reduce risk
- Outreach
- Explains
- Assist
- Enable
- Offer
- Budget
- Serves as role model
- Invest in capital knowledge
- Develops policy
- Gives money
- Promotes good science
- Leads
- Mediate
- Generate info

Verbs Describing Most Important EPA Activities

- Reevaluate
- Identify problems
- Think multilevel
- Investigate
- Acts
- Thinks strategically
- Collect data
- Promulgate
- Imagine
- Innovate
- Survey
- Studies
- Stimulates
- Explores
- Prioritizes
- Change command & control culture
- Create
- Catalyze
- Change the economic systems
- Leverage
- Allocates resources
- Administers
- Distribute
- Sets standards
- Manage risk
- Permits
- Inspect
- Cleans
- Control
- Provide expertise
- Disseminate
- Validates

Verbs Describing Most Important EPA Activities

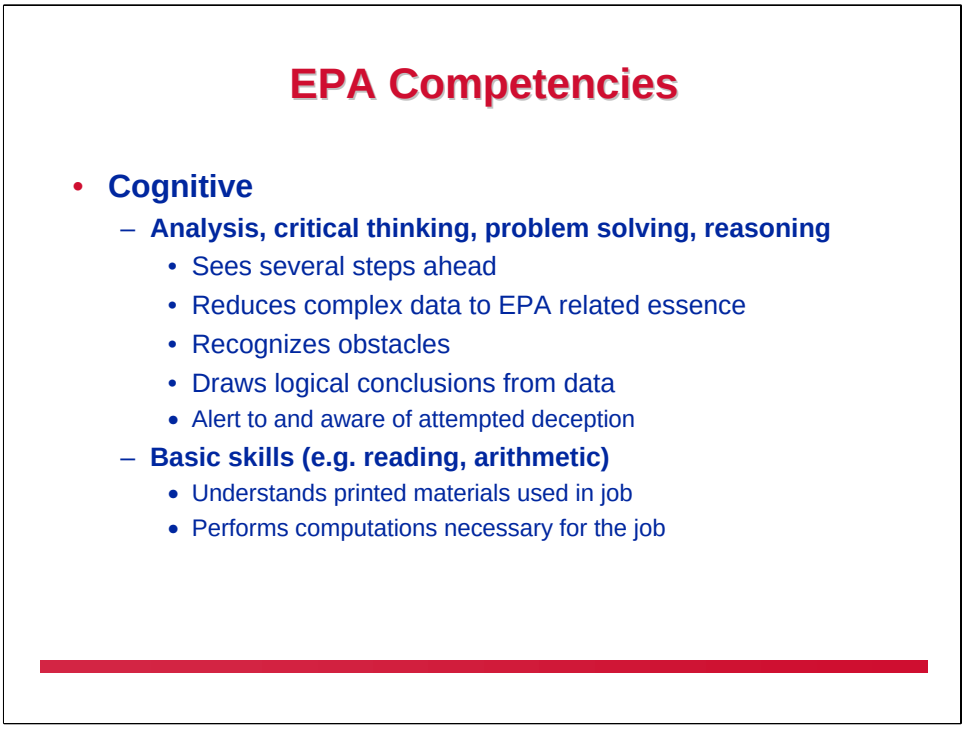
- Responds
- Adjudicate
- Settle
- Litigate
- Limit
- Inspect
- Oversee
- Incentivize
- Strengthen
- Focuses on child health
- Promotes consciousness
- Measure
- Preserve
- Inspect sites
- Execute
- Understand
- Mandate
- Maintain
- Work with congress
- Engage
- Ensure
- Assure
- Writes
- Build waste treatment plants
- Identify needs
- Mitigate
- Obstruct
- Annoy
- Restore
- Trains
- Instill knowledge
- Publishes
- Teaches
- Demonstrate need for regulations

Adaptability and dealing with change becomes increasingly important as workforce turnover accelerates and increasingly complex environmental and organizational interactions emerge.

Continual learning and information seeking has become a requirement for nearly every job at the agency as environmental impacts become more complex and interrelated.

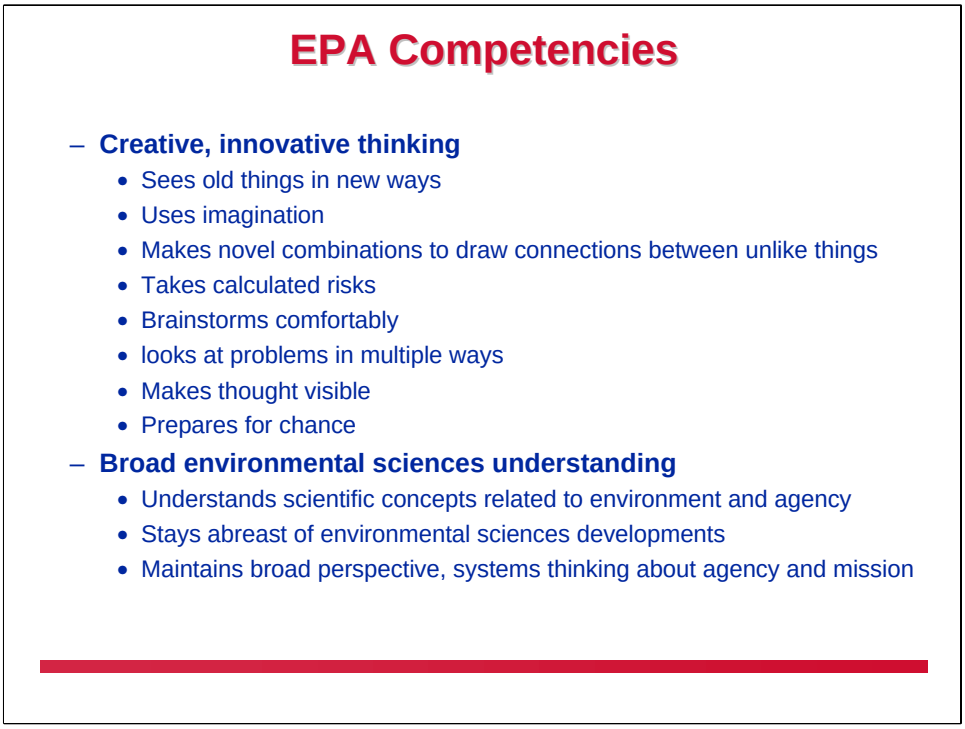
A commitment to quality was widely noted as necessary for employees in nearly every occupation--both as a commitment to the environmental mission as well as to achieve value for the tax dollars expended.

A commitment to the agency vision was widely observed and has been a major contributor to the agency's success to date. This commitment will be a critical element in the agency's plans for elevating the competencies of its employees to meet its new challenges.



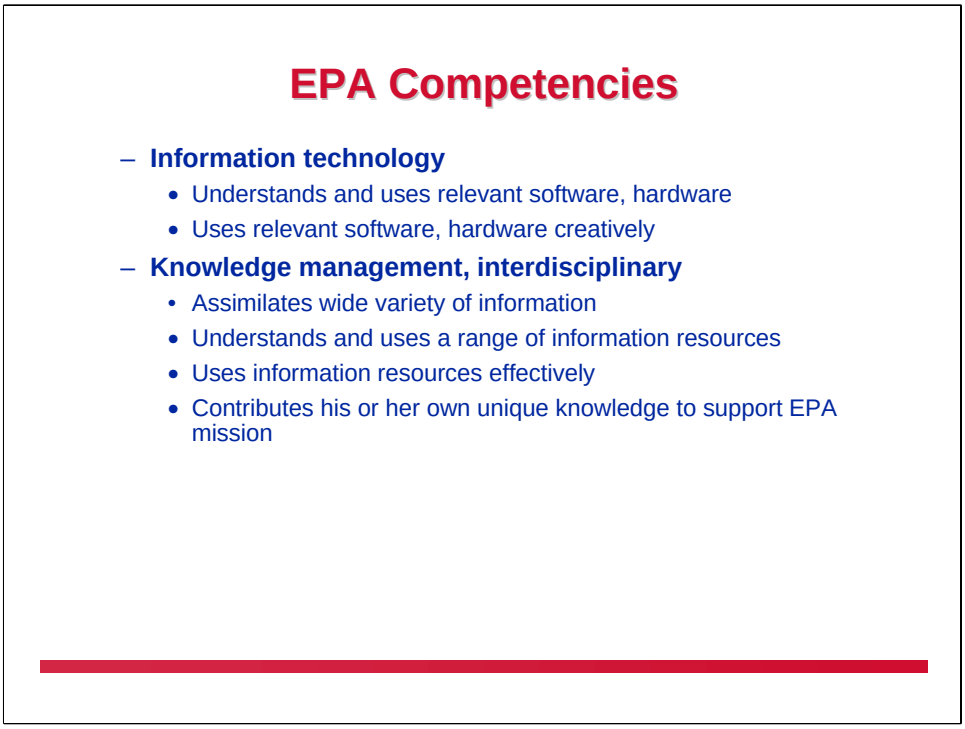
The cognitive competencies are among the agency's strongest. Those which are most critical to the agency today are analysis, critical thinking, problem solving, reasoning; a broad environmental sciences understanding; and strategic thinking.

In an agency as knowledge-oriented as the EPA, employees must possess at least basic skills, or cannot be considered for employment. As shown in the demographics section, EPA's mission requires that it compete for a highly educated employee base. Even those in support capacities must have these skills in order to perform adequately.



Creativity and innovation are more important now than at any time in the agency's history, not just in applied research but in the way the agency thinks about and responds to environmental issues and threats.

A nearly universally recognized requirement for many occupational groups was a broad understanding of the environmental sciences. This is necessary in order to recognize unexpected interactions between the various parts of a given system. It was noted that environmental problems are becoming increasingly multimedia and often international. Implications can include scientific, technical, economic, social, or other consequences.



A familiarity with and ability to apply relevant information technology is another basic skill that is required in every knowledge-based organization. It is also important that employees take responsibility for staying current in all of the technologies relevant to their position.

Related to information technology and also to communication, knowledge management is a critical competency for the agency. The agency and the public it serves needs to know what the agency knows. In order to be effective, knowledge needs to be shared and applied.

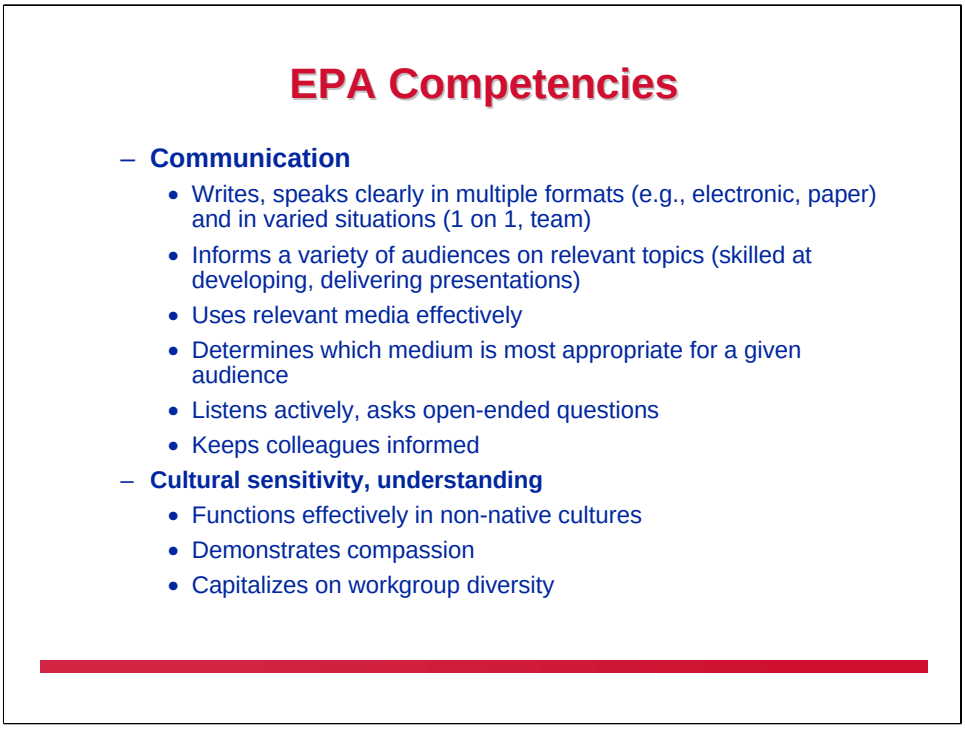
As expectations for increased productivity grow, the ability to determine and address the right priorities is a critical competency at the agency. This is an important competency for individuals as well as for units and the larger agency.

Strategic thinking was noted as important characteristic for managers who help determine the agency agenda as well as for everyone whose work influences the course of environmental protection.

Technical, functional expertise refers to those fundamental skills that are needed in any business environment--they include knowledge of how to use equipment as well as the ability to learn quickly any unique aspects to be effective in an office or lab. They also include an ability to communicate these skills to others who may be newer in the office or lab. These competencies apply mainly to office support staff.

The interpersonal competencies were among those most in need of attention agency-wide. Collaboration and teamwork were widely recognized as being essential to the success of the agency and also below the standard required to ensure that success. They apply equally to interactions inside and outside the agency.

A customer orientation was recognized as important to every occupation. As a service organization, EPA employees cannot lose site of the need to focus on internal and external customers in every contact.



Communication emerged as the most important competency for the agency as a whole and was among the top for each occupational group. The key to the agency's communication needs is the ability to convey complex information to others who may not be as familiar with it. Sometimes the communication is written, sometimes oral, sometimes electronic (using email or the World Wide Web). Sometimes the communication occurs one-on-one, sometimes in groups. The sender must understand and address the needs of the receiver.

The agency, like the nation, is culturally diverse and every aspect of the agency's work needs to consider that diversity. This diversity can pose challenges to communication and work arrangements, but meeting that challenge will be richly rewarding.

Those interviewed tended to have a long tenure with the agency and like many EPA employees had considerable organizational knowledge. There was a recognition of the need to actively improve collaboration throughout the agency. As turnover at the agency increases, it will be important to maintain this high level of organizational knowledge among the new staff.

A knowledge of how the agency operates is not sufficient. Employees should know how business works to understand the impacts the agency has on the regulated community. Understanding how other organizations function can also help employees work more effectively at EPA.

The broad-based competencies of leadership and political savvy were also identified as being necessary to the agency's success. Leadership, in particular, is an area that demands developmental attention. In times of rapid change and shifting priorities, it is critical for the agency to cultivate leaders who are able to obtain the full effort and commitment from each member of the workforce. In the new world of work, every employee has an obligation to contribute what he or she knows.

Occupation-specific skills emerged as an important competency in several occupations and a significant gap for the management group.

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Environmental Scan and Drivers of Change Report

Workforce Assessment Project -- Task 2

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Overview of Report

- Introduction
- Environmental Scan
  - List of Salient Forces
- Drivers Primer
- Drivers Process
- Moving Toward WAP Drivers
  - Categories of Forces
- WAP Drivers Defined
  - Transactional Ethics
  - Practical Acumen
  - Ecosystem Consequences
- Drivers and Alternate Futures
- Concluding Observations

This report represents the product of Task 2 of the EPA Workforce Assessment Project (WAP), focused on scanning the current and future environment to identify key forces potentially driving change. It is constructed as a briefing slide presentation with annotation text. The intent is to highlight the key points on the slides while providing deeper detail for those readers who want a more detailed story.

Following the introduction, this report briefly reviews the process used in the Environmental Scan. This Environmental Scan concludes with a list of approximately 100 forces, derived from several hundred and identified as most salient for the EPA to consider. The Drivers Primer explains the concept of a driver and describes the process used to develop three multi-dimensional drivers encompassing all the salient forces listed in the Environmental Scan. The Drivers Process section depicts that same process graphically to further the reader's understanding.

The Moving Toward WAP Drivers section shows how the forces listed in the Environmental Scan were grouped into seven single-dimensional categories familiar to government decision-makers. The next section, WAP Drivers Defined, shows how the seven categories were then deconstructed and recombined into three new, multi-dimensional drivers that are seen as key to shaping EPA's future mission and workforce competency requirements. This section also defines and explains the three drivers developed for the EPA WAP.

The Drivers and Alternate Futures section briefly explains how we will use the three multi-dimensional drivers to structure a set of alternate future scenarios in Task 3 of the WAP. These scenarios are developed in the Task 3 deliverable entitled "Alternate Future Scenarios Report." the final section of this Task 2, Concluding Observations, presents a brief set of conclusions for the EPA WAP derived from the environmental scan and drivers analysis.

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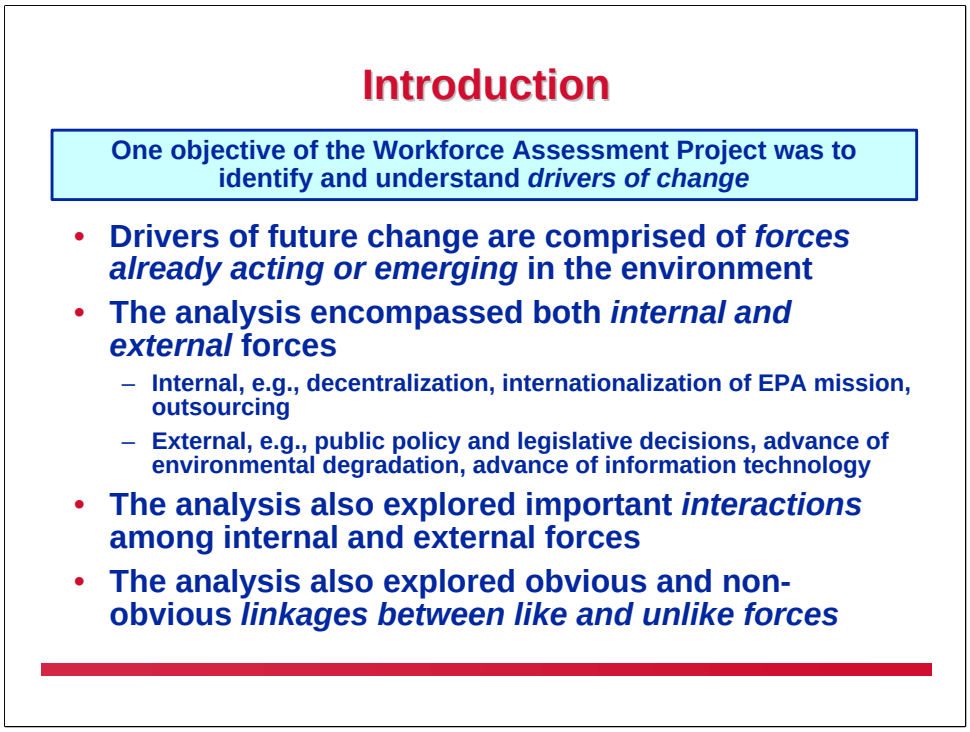
Introduction



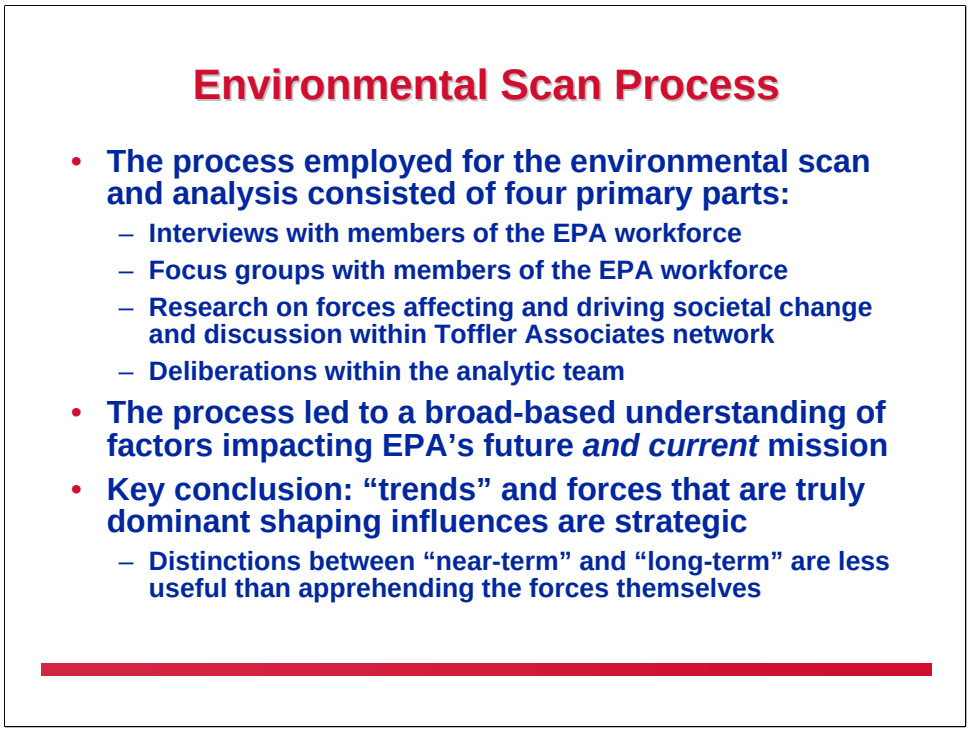
This report presents a description and interpretation of research, data gathering, and analysis conducted to identify **key drivers of change** that could affect the mission and the workforce competency requirements of EPA.

The contractor team explored a range of forces that could be important shaping influences on EPA. Numerous members of EPA's workforce were key sources of information and insight on these forces. The research, data gathering, and analysis were also deepened by more than 30 years of writing, speaking, and thinking by the noted social analysts and futurists Alvin and Heidi Toffler, and by discussion with members of our eclectic, global network of subject-area experts and analysts.

The premise underlying this task is that drivers of future change are multi-variable *combinations* of forces that already exist or are emerging in the society. Some of these forces are global, some are specific to a particular country (in this case the US), and some are specific to the organization for whom the drivers analysis is being conducted (in this case the EPA). Another way to characterize the breadth of relevant forces is to see them as external and internal forces, such as the examples provided on the slide.

Numerous forces act on an organization at any given time. The key first step in identifying drivers is to select which of these are most salient (see the Environmental Scan section). Such forces do not operate in isolation even once this is done. The real drivers of change are the "meta-forces" that emerge when individual like and unlike forces interact with one another. Subsequent sections of this report describe the process by which the individual salient forces were combined and re-combined to identify the key drivers emerging from their interaction.

Environmental Scan



Approximately 125 individual interviews were conducted with representatives of all career categories in all 12 EPA HQ Program Offices and 4 EPA Regional Offices. The subjects were asked to provide their thoughts on key forces affecting EPA's near- and longer-term future. The focus was not on the *likelihood* of specific events, but rather on the potential *impact* of change in key areas. Questions addressed not only environmental and EPA issues, but a broad range of societal issue areas such as economics, politics, social-cultural forces, etc.

Nine focus groups were conducted with approximately 15 participants per focus group. The focus groups involved representatives from all 12 HQ Program Offices and 4 Regional Offices. The objective was to facilitate sharing and clarification of ideas about the future, with the outputs to be fed into the development of drivers for the WAP. As in the interviews, the focus was broad, addressing a range of societal issues rather than only environmental and EPA-specific issues.

This research explored a range of forces, vectors, other areas that could significantly shape the future mission of EPA. The launch point for the research was a detailed review of Alvin & Heidi Toffler's writings on the Third Wave, looked at through the lens of issues important to the EPA. Subjects researched, using a range of other sources (e.g., scholarly journals and books, the internet), included population and demographics, environmental stressors, commercial and Government technology development, education, global and US political developments, global and US economic developments, and the state of various key industries.

Interactions with the EPA Workforce

- **The following specific questions were used to guide the interviews and focus groups:**
  - **What forces will most significantly shape future society?**
  - **What are some key uncertainties about the future?**
  - **What are some important challenges and opportunities in the future society?**
  - **What are some potential accelerators or inhibitors of change?**
  - **What forces will most significantly determine future environmental issues, challenges, opportunities, threats?**
  - **Who will be the key actors in environmental issues / protection? How will they interact?**
  - **What are some key future environmental issues? Will new issues emerge? Will any current issues diminish?**
  - **What will the future EPA look and act like? What are some key competencies for the future EPA workforce?**

This slide shows the set of questions that was used to guide the interviews and focus groups with EPA employees. While it was not followed rigidly, in order to allow people to talk about whatever they believed was most important to EPA's future, the question guide was useful to ensure some comparability of the data gathered from numerous different subjects.

Analytic Team Deliberations

- Insights from the interactions and research were reviewed and discussed by the analytic team
- Additional discussions were held with experts from the Toffler Associates network
- The focus of the analysis was threefold:
  - What are the powerful insights about drivers of change?
  - Where and what are the relationships among the insights?
  - Where and what are the disconnects among the insights?
- The analysis boiled several hundred forces cited as important to a list of about 100 seen as most salient
- The next 3 slides display the list of salient forces
- Slides 103-105 will sort the forces into single-dimensional categories
- Slides 107-115 will combine the forces to arrive at multi-variable drivers for EPA

The answers to the questions were analyzed individually per interview subject or per focus group, and then across the large pool of subjects. The first objective was to look for areas of convergence and divergence in people's thinking. In the course of the interactions, literally several hundred forces were identified that people thought were important potential shapers of the EPA future mission and workforce competency requirements. The second important step in the process of moving from an environmental scan to drivers was to think about and discuss the relationships among the forces identified as most salient. The team sought to understand and articulate what useful insights could be derived from the relationships among the different forces. We also sought to identify which ideas and forces did not appear to fit with others -- the presence of such forces in the pool of ideas can sometimes suggest that an important potential driver is being overlooked in the effort to find similarities.

The next three slides present a list of some 100 forces that arose repeatedly and/or forcefully, in one articulation or another, in the course of all our interactions with EPA employees. They are intentionally shown as a large list to highlight the number of variables that were seen by EPA employees as important. They are not prioritized -- this list is itself a prioritization out of the much larger collection of forces and ideas identified in the interviews and focus groups. The Moving Toward WAP Drivers section of this report shows how like forces from this list were grouped into single-dimensional categories, and the WAP Drivers Defined section shows how the forces were then combined again in new multi-dimensional groups which are the three multi-variable drivers for the WAP.

This slide shows the first part of the list of salient forces. Many are self-explanatory but some will benefit from a brief explanation here.

Globalization refers to the increasing flow of commerce, ideas, etc across international borders. Customization refers to the increasing trend toward products, services, and other aspects of life being non-standardized. Demassification is a term coined by the Toffler's, referring to the increased number and distribution of small actors in the economy, society, media, and other areas.

The degree of citizen engagement refers to political involvement, issue activism, etc. Government leadership here refers to the extent and nature of decisive or visionary leadership by government entities. Societal cohesion here refers to the extent and nature of cooperative relations among interest groups (which are themselves demassifying).

Economic interdependence is a manifestation of globalization; it is increasingly difficult for governments, businesses, or individuals to act independently in the marketplace. The desire for security and privacy could affect people's willingness to subject themselves to regulation. Omnicommunications refers to the increasing marriage of telephones, computers, satellites, and other means of communication in a "meta-system."

Acceleration as used here refers to the pace of life and pace of change. In times of rapid change, people's uncertainty will often have a great effect on the actions they take. What types of industries are ascendant in the future will have clear environmental implications. The paths chosen by less-developed countries to become modern and wealthy will impact the environment and thus the EPA.

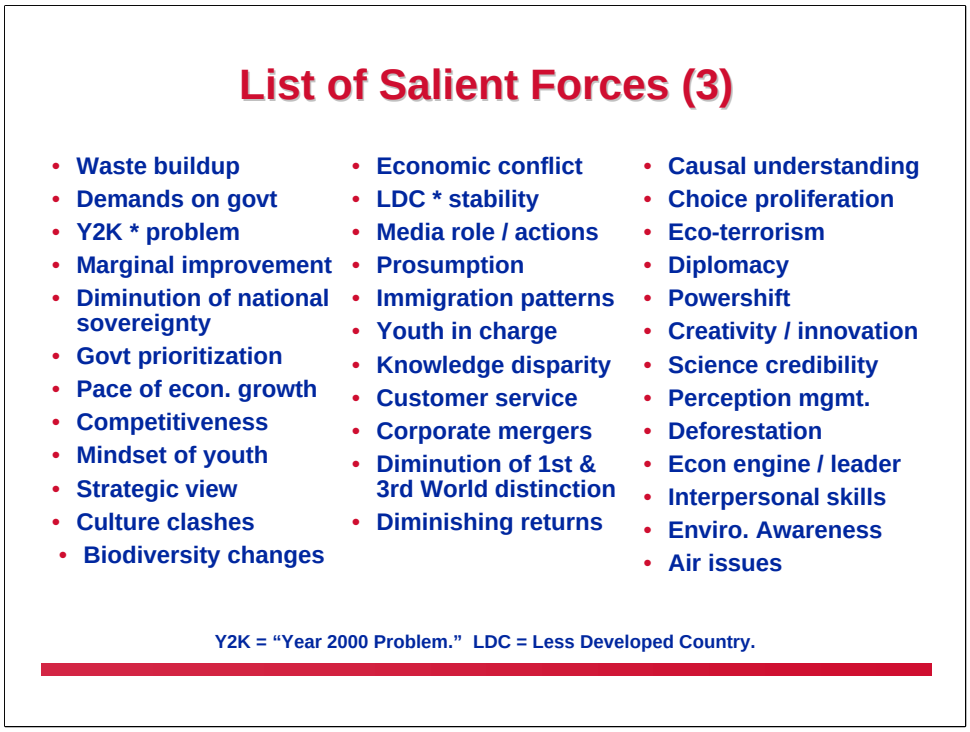
This slide shows the second part of the list of salient forces. Many are self-explanatory but some will benefit from a brief explanation here.

Changes in work refers to increased work-at-home arrangements, job-sharing, and other such changes. Transience refers to the degree to which people are, or are not, rooted in long-term jobs, communities, or other such commitments. A new ecological stressor, genetically-engineered pesticides, is a new threat for which the ecosystem or EPA may not be prepared.

Public service sense refers to the degree of commitment to public service jobs or activities. Holistic outlook refers to the degree to which people are able to see things from a "big-picture" viewpoint, to see interactions among things. Risk aversion refers to how much or how little environmental or other types of risk we are willing to live with.

Regionalism refers to the increasing trend toward seeing things in regional rather than national or state terms. Silo mentality is the flip side of the holistic outlook and refers most directly to the tendency in government to look at issues as discrete. Future shock is a term coined by the Toffler's, referring to the difficulty people experience living in an environment of fast-paced change as we move into the future.

Diminution of C2 refers to the increasing trend toward cooperative rules and structures and away from rigid, enforced rules. Knowledge economy refers to the increased importance of ideas in economic activities. Sense of entitlement refers to what public goods are expected of government. Institutional change refers to the degree of ease of changing how governments and other social structures do their business.



This slide shows the third part of the list of salient forces. Like the other lists, many are self-explanatory but some will benefit from a brief explanation.

Marginal improvement refers to the relative emphasis on making continual advances in known areas of endeavor vs focusing attention on new areas. Government prioritization refers to how the government elects to apply its limited resources, and to what issues. Mindset of youth refers to the different views and values younger generations may have relative to older generations. Strategic view refers to the degree to which people and organizations have a long-term vs short-term perspective.

LDC stability concerns the nature and pace of economic growth and political change in less-developed countries. Prosumption is a term coined by the Toffler's, referring to people's increasing involvement in the production of the goods and services they consume. Knowledge disparity is the impact on some in society having less opportunity to benefit from electronic and other information and educational sources.

Causal understanding refers to the degree to which we understand and address the causes of negative consequences in the society, environment, and other life areas. Choice proliferation is the increasing number of things people can now choose from (e.g., the high number of things to buy and ideas they can support). Powershift is a term coined by the Toffler's, referring to dramatic changes not in the distribution of power among people, businesses, and nations, but rather in the nature of power and how it is exercised. Economic engine/leader refers to whether any country or other actor can fuel growth and prosperity in the global economy.

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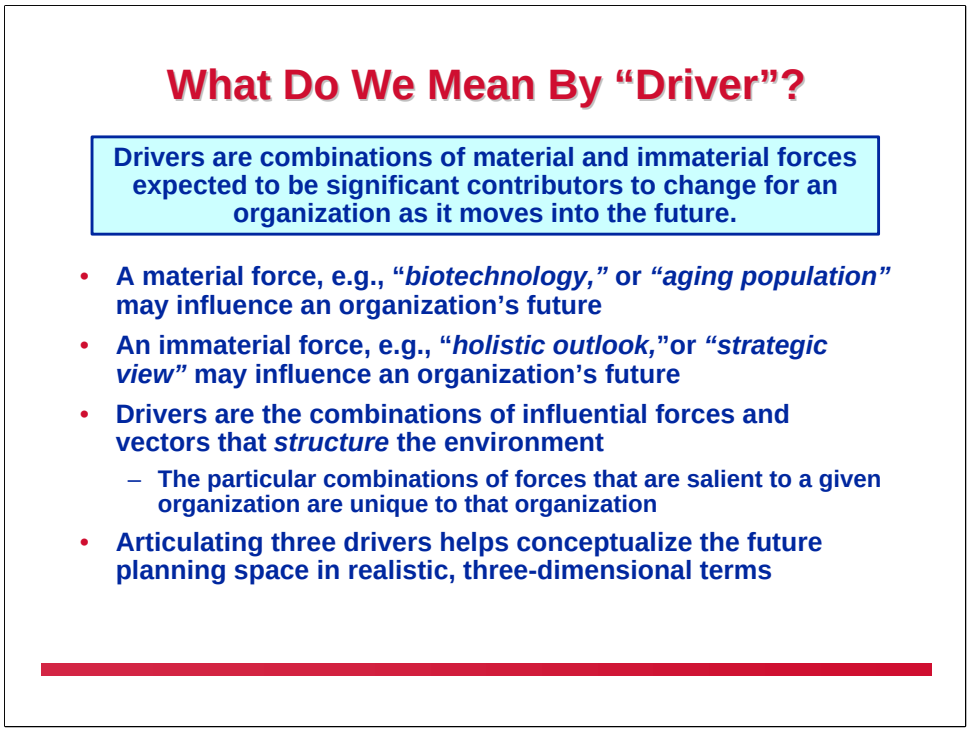
Drivers Primer



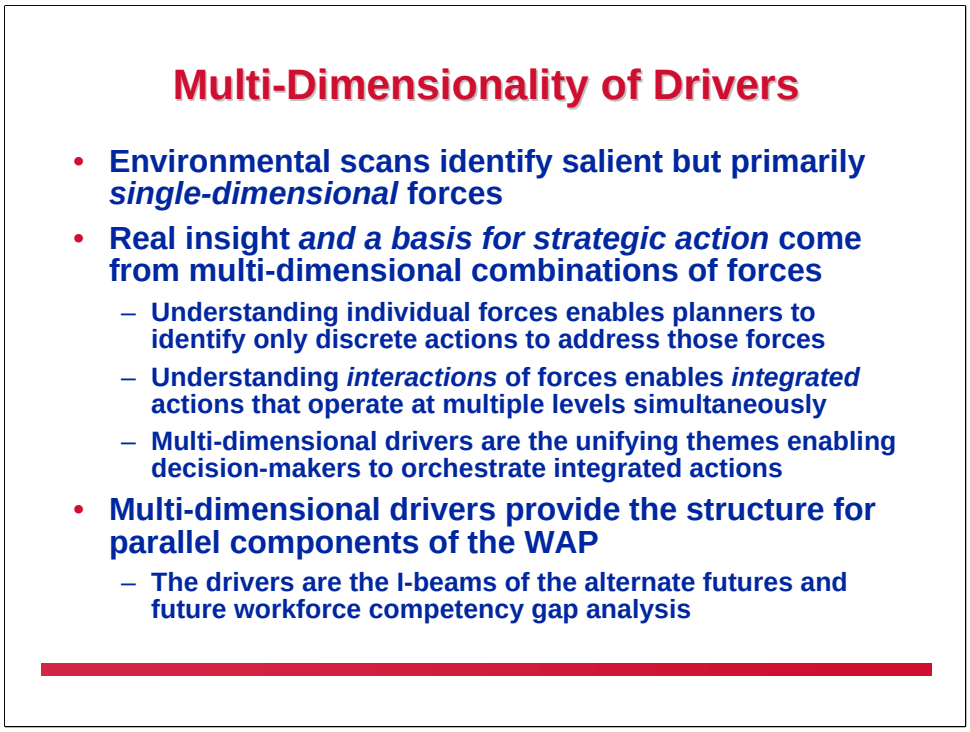
The WAP Environmental Scan identified a large number of forces that will likely influence EPA's future mission and workforce. Clearly, considering this large a number of forces is not useful as a basis for understanding the potential future decision-making environment.

Experience has shown us that real insight into what will most profoundly shape an organization's future comes from focusing on the combinations of forces such as those listed at the end of the Environmental Scan section. An organization must understand how key elements of its environment affect one another to be truly strategic in its actions and policies.

These combinations of forces are refered to as "drivers." The forces comprising such drivers are generally a mix of material and immaterial forces. The forces in the list of identified salient forces for the WAP are clearly such a mix.

Drivers are best understood as the structure of the environment in which we live now and may live in the future. While individual forces can and do spur particular behaviors and changes at a "tactical" level, it is frequently the combination of such forces that cause change at the strategic level.

Experience has shown that thinking in terms of three drivers is the most effective way to structure an understanding of the current and future environment. Relying on two key drivers leads to dichotomous conclusions and insights; the future is perceived in terms of black-or-white, not shades of gray. Reliance on many drivers leads to "conclusions" that are inconclusive, and can result in a diminished clarity about what actions will produce a useful impact.



As in any such analysis, the forces identified in the WAP Environmental Scan were generally single-dimensional. That is, things like climate change, diversity, or the growth of small businesses are best and most clearly understood as forces when considered in isolation from each other. However, their real societal impact comes from their interaction with each other and with other discrete forces.

Effective decisions and actions come not via extrapolating from current trends in single-dimensional areas and identifying individual actions to take in response. Rather, they come from understanding the unifying themes or “meta-forces” behind individual forces, and identifying organizational actions that work on multiple, inter-related levels simultaneously to solve complex problems.

The multi-dimensional drivers developed for the WAP were built in a creative analytical process from the list of salient forces identified in the Environmental Scan. They provide the internal structure and foundation for subsequent WAP tasks, including the development of alternate future scenarios and the eventual identification of potential future workforce competency gaps.

Criteria for Selecting Drivers

- **Candidate drivers must be evaluated to ensure their salience and utility**
  - **Criterion 1. Clear and important contributor to change**
  - **Criterion 2. Multi-variable**
  - **Criterion 3. Beyond the control of relevant actors**
  - **Criterion 4. Orthogonal (reasonably exclusive of each other)**
  - **Criterion 5. Relevant to the organization's unique interests**
- **The issue of control is important to consider**
  - **Individual forces (e.g., pace of economic growth) may be controllable or subject to influence**
  - **But useful drivers encapsulate *interactions among* forces**
  - **The nature, character, and manifestation of these interactions generally are outside of any actor's control**

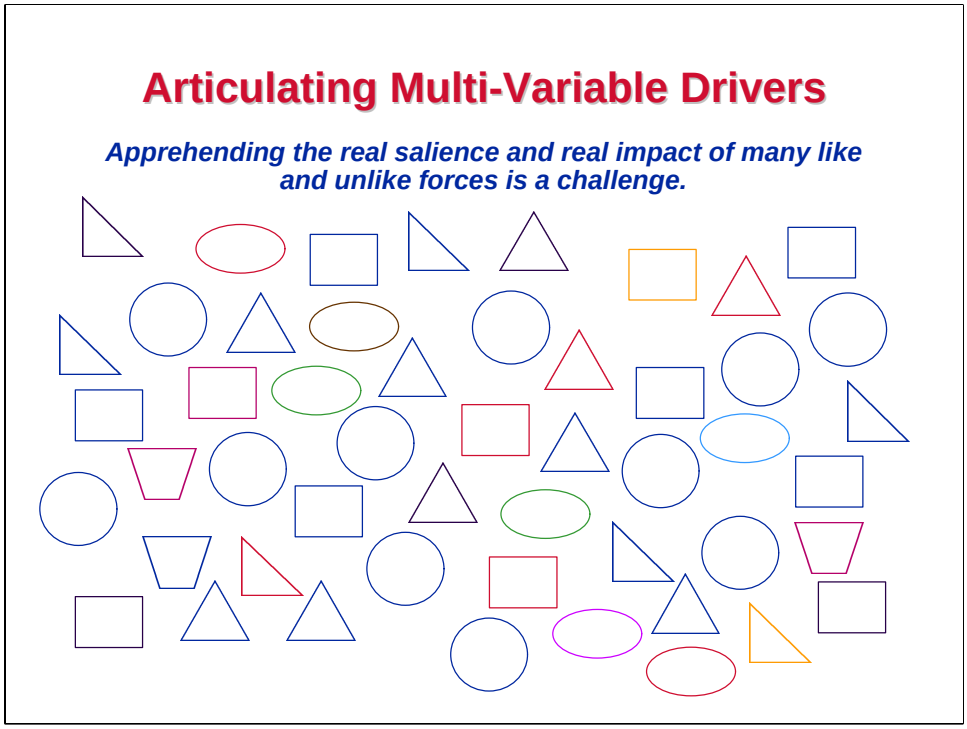
Analysis of the salient forces affecting an organization, and the complex interactions of those forces, eventually leads to identification of a set of candidate drivers. These candidate drivers must be reviewed against a set of criteria to ensure they are useful to the organization.

Evaluation is important because there are a number of ways that forces could be combined into different drivers -- i.e., more than three potential drivers can be identified for a single organization. It is important to ensure that the three selected, while not the *only possible* drivers, will provide new and useful insights and ways of thinking about organizational challenges.

Candidate drivers should be subjected to tests to ensure that they meet the criteria outlined on this slide. They should be compared against one another to ensure they are sufficiently orthogonal. They should be reviewed against individual salient forces to ensure they are sufficiently multi-dimensional. They should be measured against some metric of consequence (e.g., the consequences to society if a candidate driver manifests at one or the other of its antipodes) to ensure they are sufficiently clear contributors to change. They should be reviewed against potential inhibiting or mitigating actions to ensure they are sufficiently outside the control of any actor. Finally, they should be reviewed against the organization's mission statement or strategic plan to ensure they are sufficiently relevant to the organization's unique interests.

It is important to understand that the multi-dimensional nature of well-articulated drivers is what places them outside the control of the actors affected by them. Individual forces can sometimes be controlled through policies, procedures, and actions an organization takes or directs. However, drivers represent combinations of forces, and the outcomes of there interactions are unpredictable. This effectively makes the drivers uncontrollable.

Drivers Process

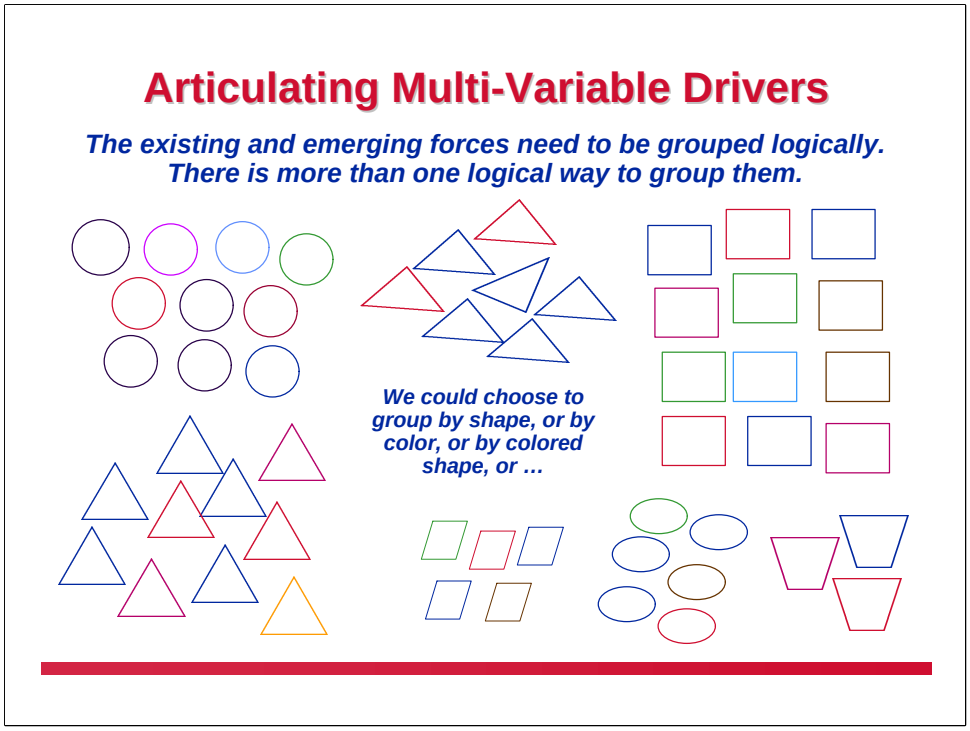


The process of thinking about how a large number of forces interact with one another is a creative one, not a mechanical or purely analytical one. As noted on the preceding slide, there are numerous ways that such forces interact. Different forces in different combinations are of importance to different organizations depending on their mission and resources. Because the process combines creativity and analysis, the outcome arrived at is not the only way to understand the forces acting on EPA, but the drivers identified provide EPA with a powerful new way to see itself, its future, and its future workforce competency requirements.

The remaining slides in this section graphically depict the intellectual process used to derive the multi-dimensional drivers for the EPA WAP.

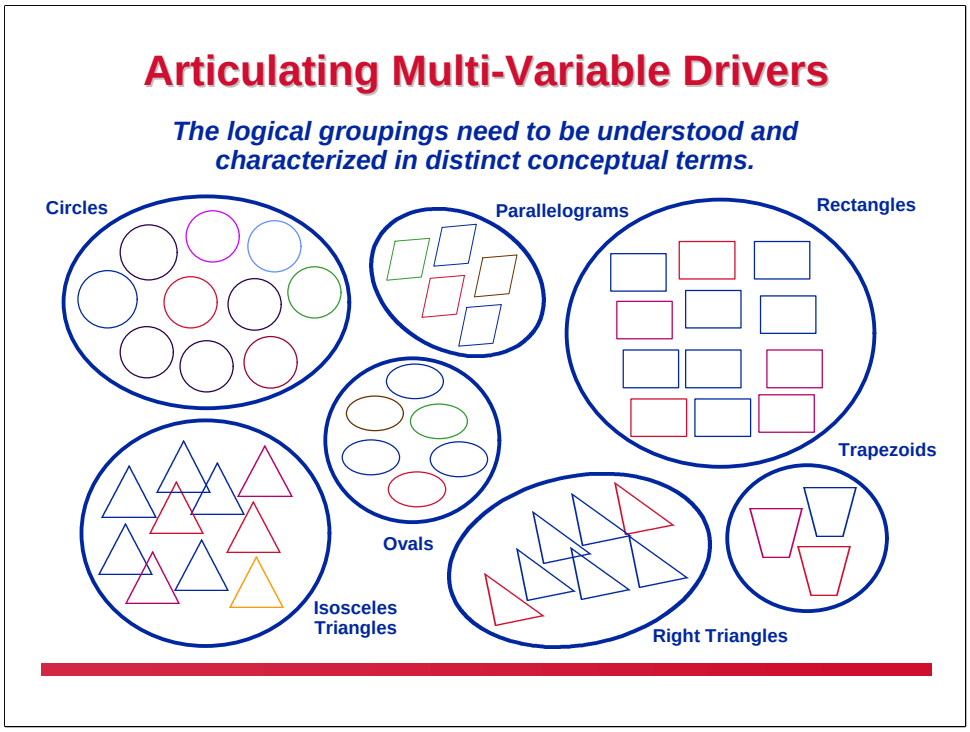
The sections following this graphical depiction of the process will mirror the graphical depiction in this section, describing in words and ideas how the process was applied for the WAP. The first section describes how the large group of salient forces was sorted into seven single-dimensional categories. The next section describes how the analysis then “shifted the paradigm” by deconstructing these categories and recombining the forces in three new multi-dimensional groups which are the WAP drivers.

This slide is intended to represent graphically the list of salient forces on slides 103-105.

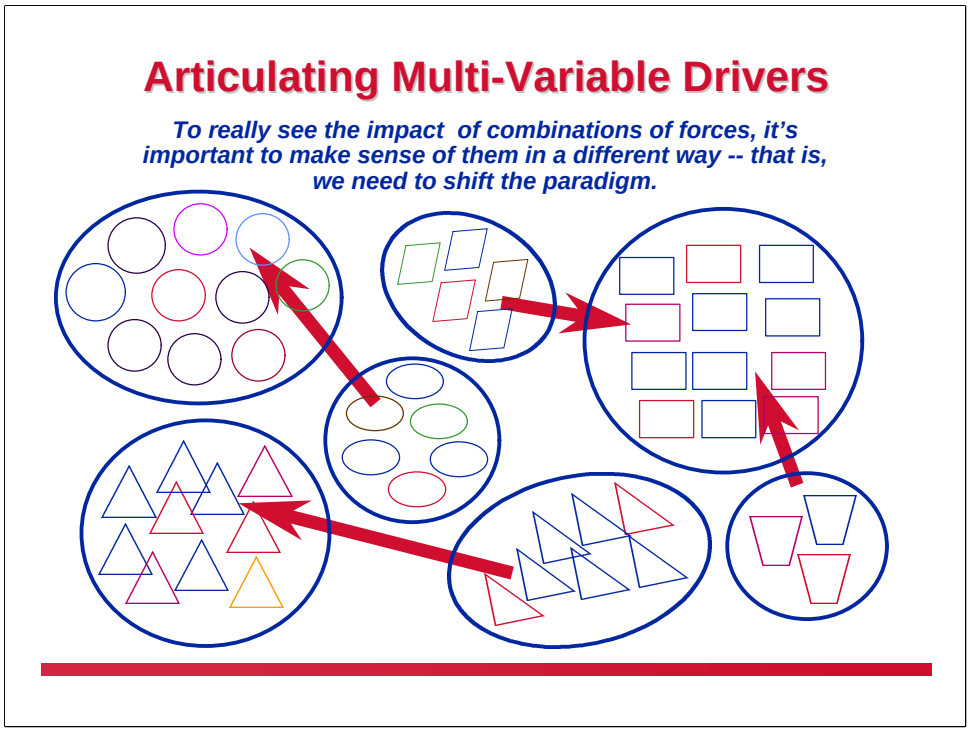


This slide represents graphically how a collection of forces identified as salient can be grouped in logical categories based on their similarity to one another.

This first stage of the process takes single-dimensional forces and intellectually places them in single-dimensional categories. This stage enables an understanding of the more obvious connections between and among the various forces.

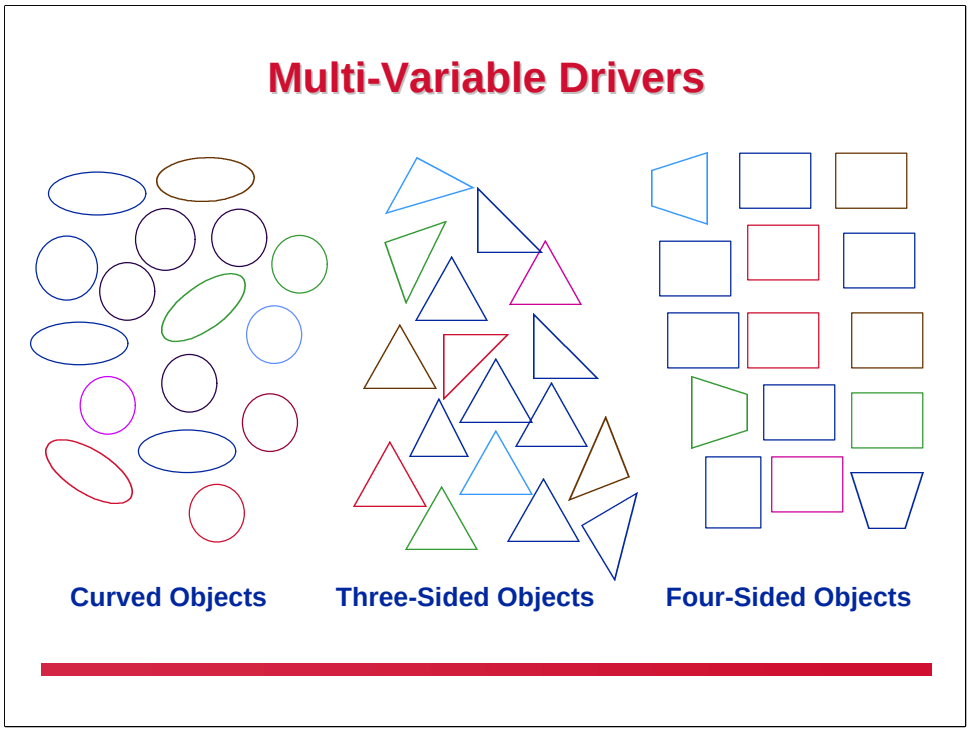


This slide represents the stage of the process in which the logical, single-dimensional categories are characterized in substantive terms. It is important to understand what it means to define a group or category of forces (e.g., as "political forces" or "psychological forces"). Consensus around what kinds of forces to include in such a category, and what kinds of forces to exclude, clarifies the analysis.



This slide represents the stage of the process in which groups or categories of forces are "deconstructed" -- i.e., broken back out of their categories -- and the individual forces are combined with one another in a different way.

This stage of the process is important because the combination of forces in a new way enables a new, novel kind of understanding of the organization's future. The new categories or groups are more multi-dimensional, in part because they take into account not only the obvious connections among forces, but also the more subtle, less obvious connections. This deeper, more multi-dimensional understanding is the key to identifying useful multi-dimensional drivers for the organization.

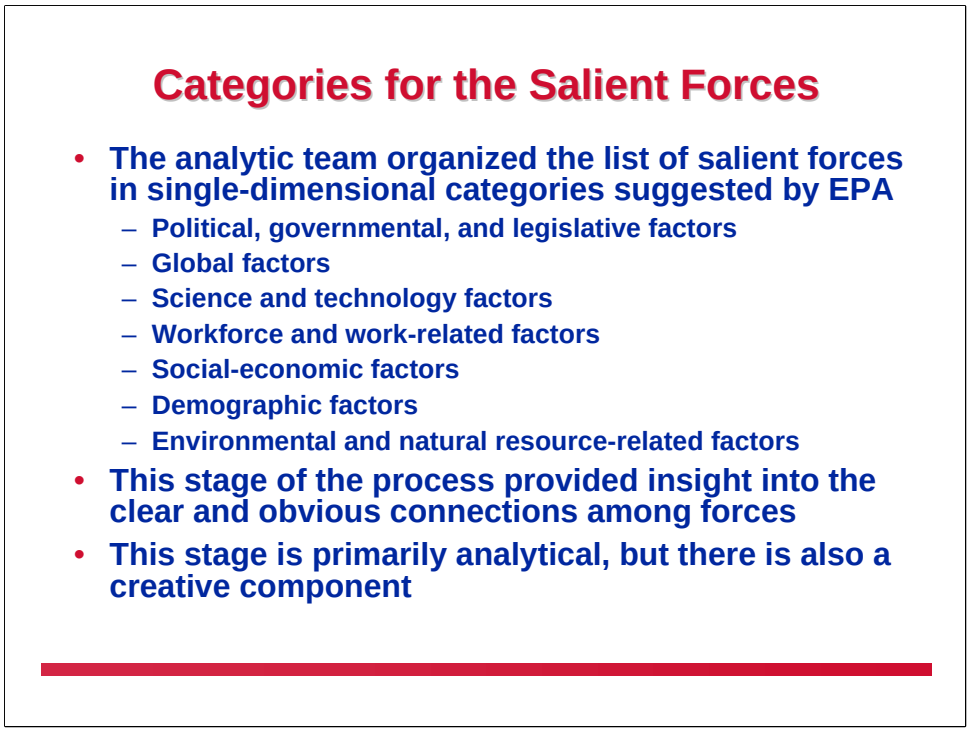


This slide represents graphically the last stage of the process, in which the deconstruction of the single-dimensional categories and the recombination of forces into new, multi-dimensional categories leads to identification and definition of three multi-dimensional drivers.

In the graphic slide above, the objects in each new category are alike in some ways, but unlike in other ways (e.g., all of the four-sided objects have four sides, but not all of them have all four sides of equal length). The category “four-sided objects” is therefore multi-dimensional, and the unifying theme among the objects is the number of sides they have.

The grouping of the objects in the graphic slide above is intended to illustrate, by visual analogy, how different forces acting on an organization can be understood to be different but still connected by a unifying theme. When grouped in terms of that unifying theme, the grouping is referred to as a “multi-dimensional driver.”

Moving Toward WAP Drivers

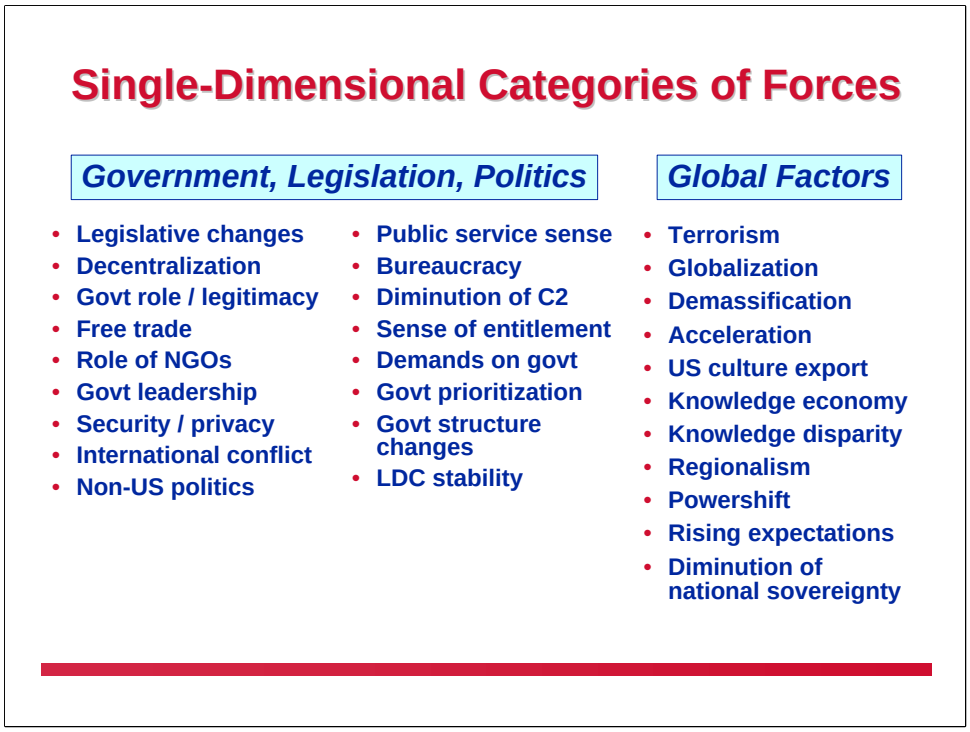


In a series of discussions and internal workshop sessions, an analytic team reviewed the list of salient forces shown on slides 103-105. The team discussed how they related to one another and how they could be grouped logically in the single-dimensional categories suggested by the EPA in the Statement of Work for the WAP.

The set of categories suggested by the EPA provided a useful way to do the first sort of the salient forces because they were characterized in intellectual terms familiar to government decision-makers and a broad range of social analysts.

As suggested in the previous section of this report, grouping the salient forces in single-dimensional categories such as these provided important insights into the more obvious connections and affinities between and among the forces.

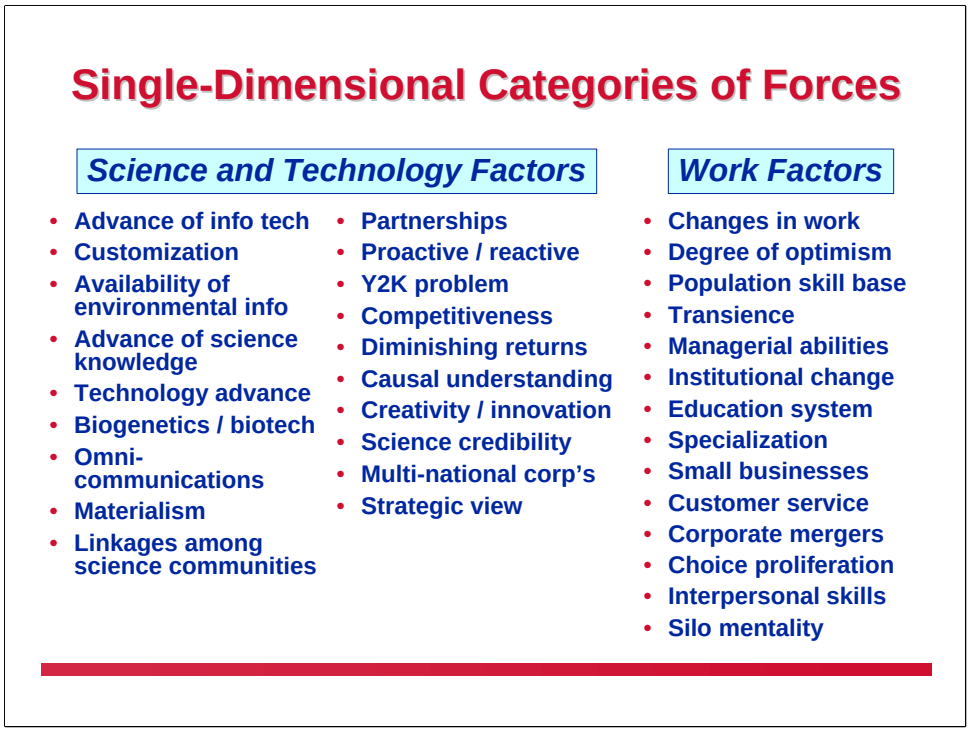
At the same time, even in this stage of the process, there is a creative as well as an analytic component. That is, given the broad range of forces and factors, there was more than one way to do the sorting and categorization. For example, “free trade” could be placed in a category focused on the political plane, or it could be placed in a category focused on the economic plane. Either choice would provide useful insight -- the sorting choices of the analytic team were made based on where it thought the more useful and tailored insights would come.



This slide, and each of the next three slides, shows how the analytic team decided to sort the list of salient forces into the single-dimensional categories suggested by the EPA.

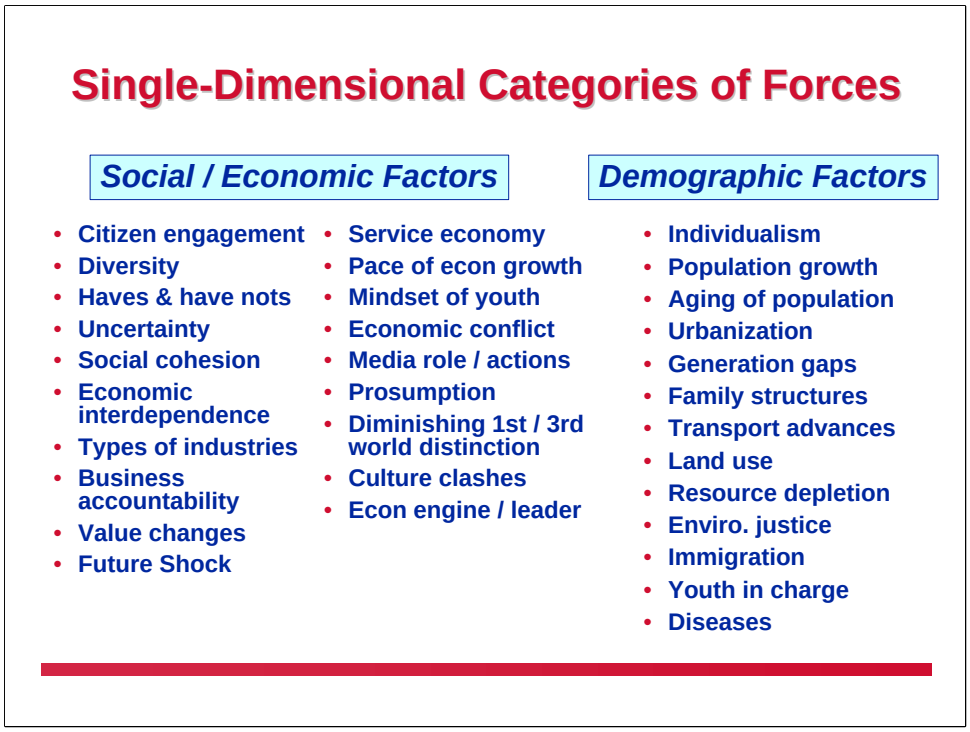
The forces collected under “Government, Legislation, and Politics” reflect the analysis of how changes in the roles, responsibilities, and processes of government could impact the EPA -- both positively and negatively. The category includes forces having to do with people’s attitudes towards government (e.g., government role and legitimacy; sense of entitlement; security and privacy), the increased number and increasingly complex nature of relationships government must maintain (e.g., role of NGOs; LDC stability), new paradigms for the conduct of government business (e.g., diminution of C2), tough choices government and political decision-makers must face (e.g., government prioritization), and other considerations.

The forces collected under “Global Factors” reflect the analysis of how forces operating above and outside of U.S. borders could impact the EPA -- both positively and negatively. The category includes forces having to do with changes in the structure of institutions and international relations (e.g., demassification and the diminution of national sovereignty); the increasingly critical role of knowledge and information in all aspects of life for all people (e.g., knowledge economy; knowledge disparity); pressures on people’s psyches and emotions (e.g., acceleration; rising expectations); and other considerations.



The forces collected under "Science and Technology Factors" reflect the analysis of how advances in this area could impact the EPA -- both positively and negatively. The category includes forces having to do with specific technology area developments (e.g., advance of information technology; biogenetics); fusion of technology areas (e.g., linkages among science communites and omnicommunications); uses of technology (e.g., availability of environmental information; proactive / reactive); approaches to science and technology development (e.g., creativity/ innovation; partnerships); and other considerations.

The forces collected under "Work and Work-Related Factors" reflect the analysis of how changes in the nature, conduct, and perhaps even definition of work could impact the EPA -- both positively and negatively. The category includes forces having to do with who and what will be available for employers (e.g., population skill base; education system); specific competencies (e.g., managerial abilities; interpersonal skills); attitudes toward work and career (e.g., degree of optimism; silo mentality); social-cultural trends as reflected in the work arena (e.g., transience; choice proliferation); and other considerations.



The forces collected under “Social / Economic Factors” reflect the analysis of how changes in the way we make wealth and the way we organize our society could impact the EPA -- both positively and negatively. The category includes forces having to do with structural changes in economic institutions and relations (e.g., service economy, economic interdependence, prosumption); instability (e.g., economic conflict, haves and have nots, Future Shock); attitudes toward community and responsibility (e.g., citizen engagement, culture clashes, social cohesion); and other considerations.

The forces collected under “Demographic Factors” reflect the analysis of how changes in the U.S. and global population and its structures could impact the EPA -- both positively and negatively. The category includes forces having to do with human impact and demands on the places we live (e.g., population growth, urbanization, resource depletion); changes in authority relationships (e.g., environmental justice; family structures); generational changes (e.g., aging of population, youth in charge); technologies employed to enhance or change quality of life (e.g., transport advances, land use); and other considerations.

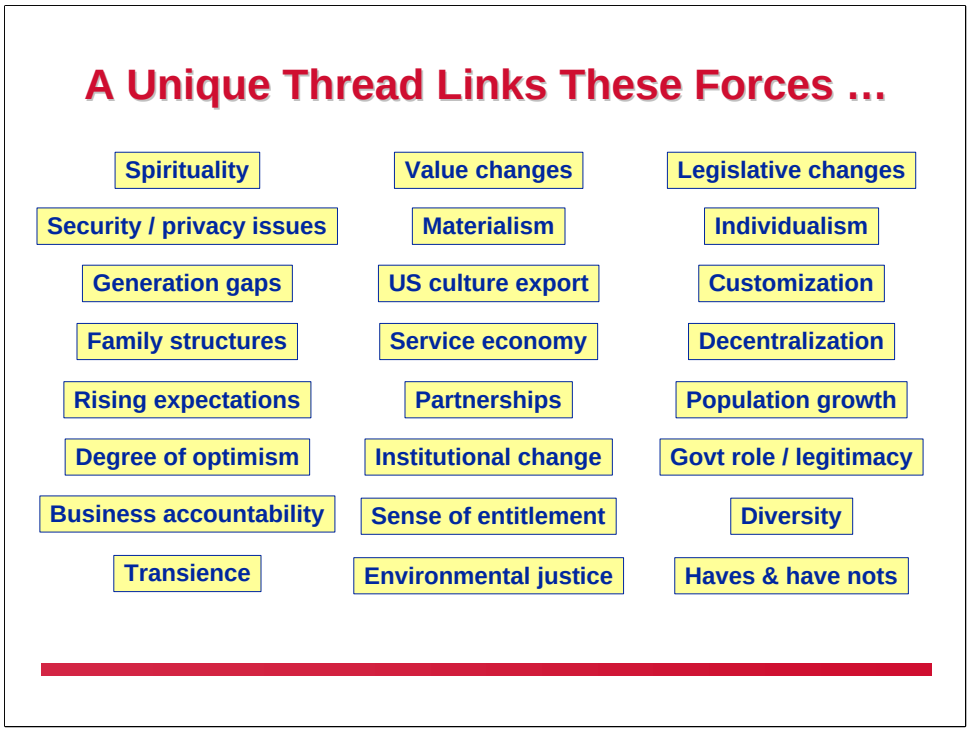
Single-Dimensional Categories of Forces

Environmental and Natural Resources Factors

- **Complexity**
- **Environmental awareness**
- **Unintended consequences**
- **Climate change**
- **Spirituality**
- **Environmental degradation**
- **LDC development paths**
- **Sustainable practices**
- **Energy sources**
- **Water issues**
- **Public health trends**
- **Biodiversity changes**
- **Air issues**
- **New ecological stressors**
- **Holistic viewpoint**
- **Risk aversion**
- **Scale issues**
- **Agriculture changes**
- **Waste buildup**
- **Marginal improvements**
- **New environmental threats**
- **Eco-terrorism**
- **Perception management**
- **Deforestation**

The forces collected under “Environment and Natural Resource Factors” reflect the analysis of how changes in its historical areas of responsibility could impact the EPA -- both positively and negatively. The category includes forces having to do with traditional/known environmental protection concerns (e.g., water issues, air issues, waste buildup); emerging challenges not yet well understood (e.g., new ecological stressors, unintended consequences); changes in how we think about the elements of the environment (e.g., complexity, holistic outlook); political and economic developments as they impact the environment (e.g., LDC development paths, agriculture changes); approaches to environmental protection (e.g., marginal improvements, spirituality); and other considerations.

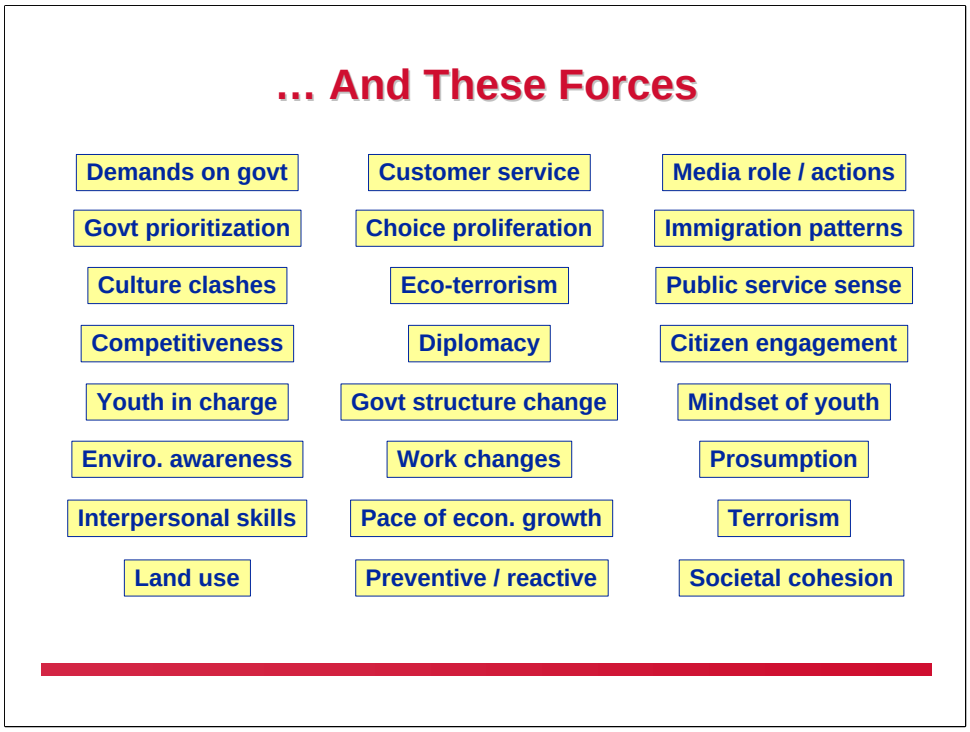
WAP Drivers Defined



This section of the report describes how the analytic team deconstructed the groupings of forces outlined in the previous section and recombined them into new, multi-dimensional categories to arrive at three multi-dimensional drivers that they believe have particular relevance for the EPA's future mission and future workforce competency requirements.

This represents the most creative component of the analytic process. Here even more than in the previous section, there are a number of different ways that the forces could be combined to form different multi-dimensional groups. The team asserts that the groupings described in this section offer a unique and powerful way for the EPA to understand its future environment, its challenges and opportunities.

The collection of forces shown on this and the next slide combine forces drawn from each of the seven earlier, single-dimensional categories. It represents a unifying theme having to do with what people expect and demand of themselves, their fellow men and women, and the social, political, and economic institutions that form the structure of our society. These expectations and demands can be, and are, reflected in choices people make about what jobs and careers to pursue, where to live, what kinds of interpersonal and "official" relationships to prioritize, what kind of government to live under, and, in the broadest sense, how to view the world and how to live their lives.



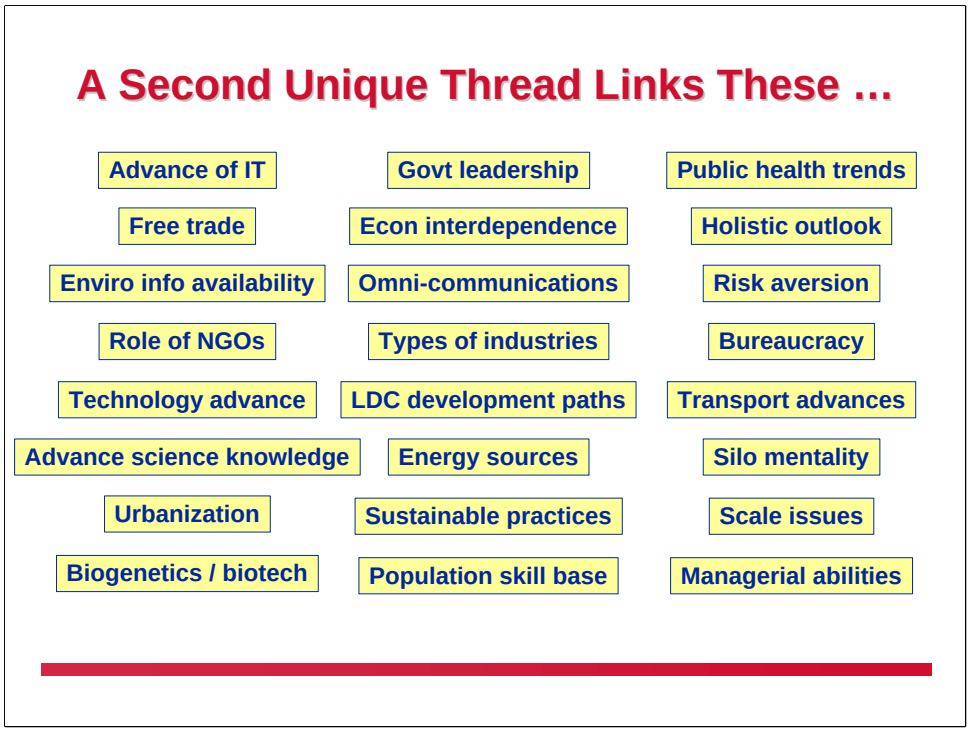
The forces collected on this slide, combined with those on the previous slide, form the first of the three multi-dimensional drivers developed for the EPA WAP.

The term "Transactional Ethics" was chosen to characterize the first EPA WAP driver. The driver is defined in this slide.

"Transactional Ethics" is based on the understanding arrived at during analysis that, in an important sense, every action we take as individuals or as members of organizations (e.g., businesses, polities, households) are transactions with the environment. To a greater or lesser extent, everything we do affects the environment in some way. This driver has to do with the extent to which individuals are responsible or ethical in those transactions -- are we thinking primarily and expansively of the benefit to both sides in these "transactions," or are we thinking primarily and narrowly of ourselves?

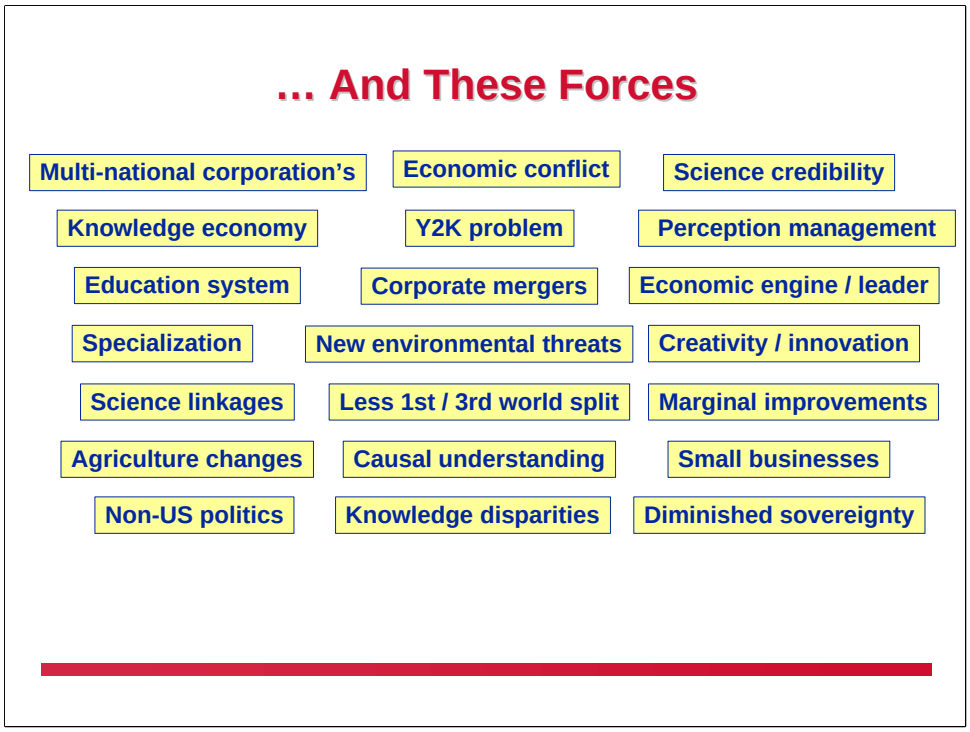
"Transactional Ethics" is multi-dimensional and salient to the EPA. It captures the critical dimension of how we make wealth as a society, arguably a fundamental shaping influence on all other aspects of society. It captures both our individual behaviors and the actions of businesses, governments, and other institutions. It encompasses both the de jure regulation of these behaviors and actions (e.g., laws, formal rules, regulations like those promulgated and enforced by EPA) and de facto regulation (i.e, the social, informal, and attitudinal spurs to, and constraints on, behavior, increasingly seen as a medium in which EPA can and must work to fulfill its mission).

The driver can be seen as a continuum. That is, the degree of people's and society's accountability and responsibility can be seen as "high" (i.e., we are very mindful of the ethics of our transactions with the environment) or "low" (i.e., we do not behave with a great deal of accountability in these transactions). Manifestation of this driver more toward one or the other of these antipodes of the continuum will result in very different futures for the society and very different roles, missions, and responsibilities for EPA.

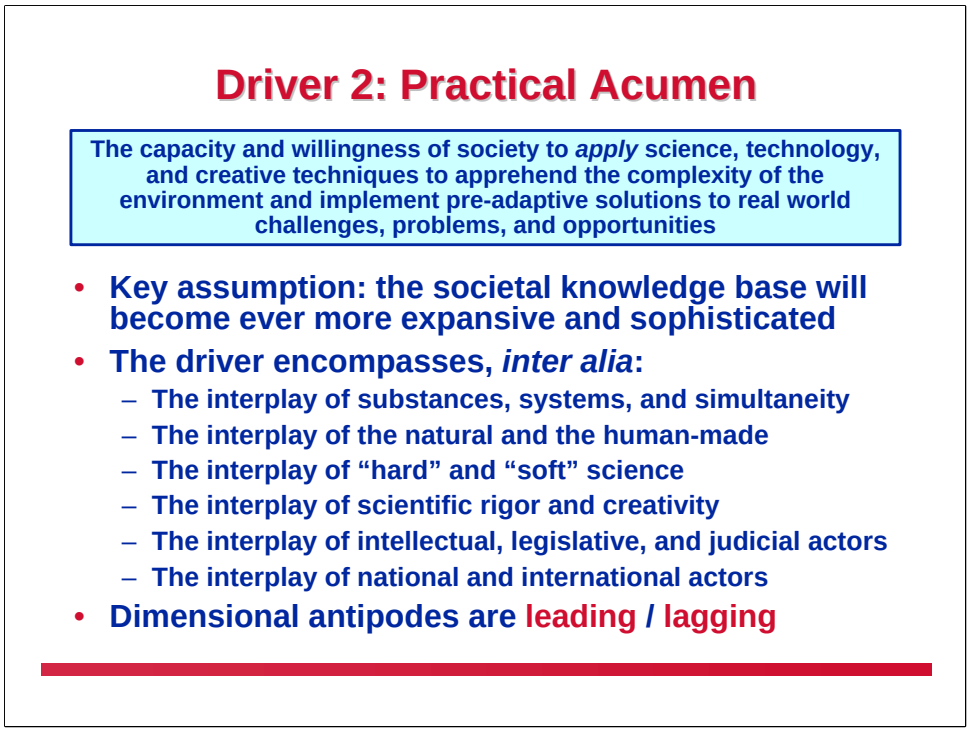


The collection of forces shown on this slide and the next combine forces drawn from each of the seven earlier, single-dimensional categories. They represent a unifying theme having to do with our relative ability or inability as a society to put our ever-advancing knowledge base to work to address complex societal issues and problems.

Whether and how we are able to effectively apply our knowledge base is reflected in the kinds of scientific and technological pursuits we engage in, support, and subsidize. It is reflected in the kinds of institutions and organizations and structures we create to help us apply the knowledge base to useful and worthwhile ends. It is reflected in the value we attach to particular kinds of expertise and activities, as manifested in pay scales for different occupations and the presence or absence of particular subject areas in school curricula. It is also reflected in the choices we make about where we live and how and whether to improve those places; the choices we make about what domestic and international political leaders and movements to support or oppose; and in the choices we make about our relative focus on the narrow or big picture, the micro or the macro.



The forces collected on this slide, combined with those on the previous slide, form the second of the three multi-dimensional drivers developed for the EPA WAP.

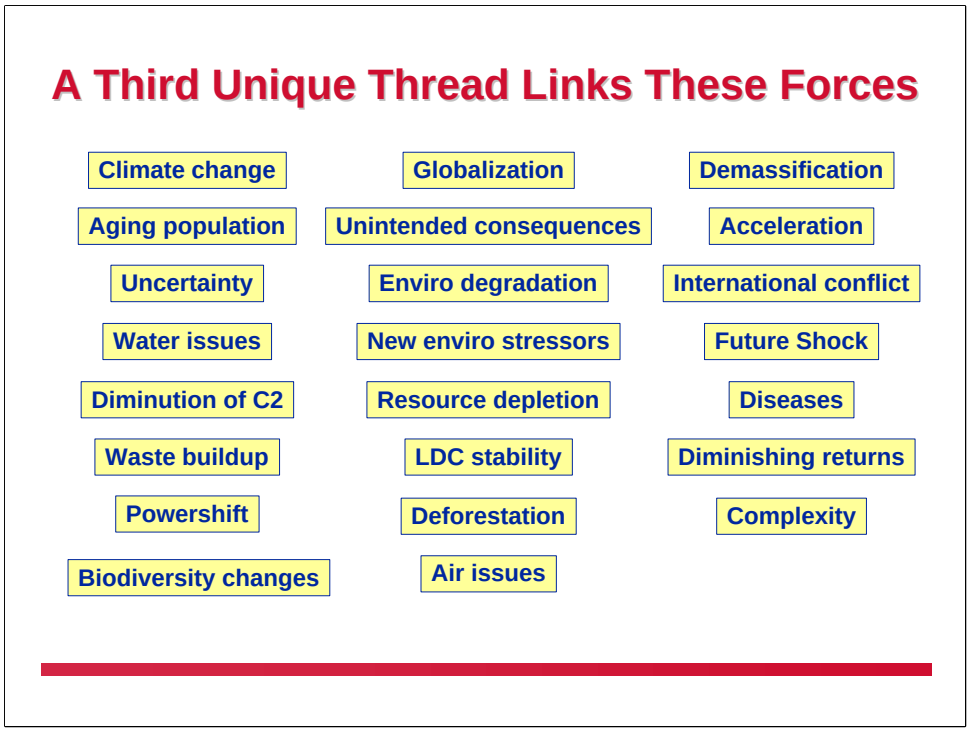


The term "Practical Acumen" was chosen to characterize the second EPA WAP driver and is defined in this slide.

"Practical Acumen" is based on an assumption underlying the analysis -- and strengthened by that analysis -- that the knowledge base of the human society will expand continually. The natural curiosity of humankind cannot help but lead to continual new discovery and understanding of the world around us and the ways in which we can shape that world. This driver has to do with what we do with our knowledge, and how effective we are able to be in doing with it whatever we elect to do.

"Practical Acumen" is multi-dimensional and salient to the EPA. It addresses the ability of humankind to exercise control over the critical, complex, and increasingly simultaneous canceling and amplifying inter-relationships among naturally-occurring and man-made substances, and naturally-occurring and man-made systems (including ecosystems). It captures the increasingly important fusion of the hard and soft sciences to enable powerful new ways of understanding and shaping the world. It captures the important idea that science and technology is insufficiently powerful to address societal issues, challenges, and opportunities without imagination, emotion, and creativity. It captures the important relationships among policymaking, legal regulation, and science and technology (i.e., the institutional features in the political and judicial processes that either facilitate or constrain science, technology, and intellectual creativity in the service of social change and the environment).

The driver can be seen as a continuum. That is, our ability to apply science, technology, and intellectual creativity in an effective manner can be seen as "leading" (i.e., out in front of the issues against which the knowledge base is applied) or "lagging" (i.e., reactive to these issues rather than out in front of them). Manifestation of this driver more toward one or the other of these antipodes of the continuum will result in very different futures for society and very different roles, missions, and responsibilities for EPA.



The collection of forces shown on this slide combine forces drawn from each of the seven earlier, single-dimensional categories. It represents a unifying theme having to do with the level of interactivity between humans and their environment that is potentially controllable, foreseeable, and/or correctable.

The relative ability or inability of humankind to control its environment, to create structures and processes to mitigate the effects of natural and naturally-occurring phenomena, is reflected on both the environmental and the social-cultural planes. That is, much of what is collected in this driver category has to do with forces of nature (e.g., climate change, deforestation, the emergence of diseases, and evolution of biodiversity). All of these forces of nature are affected and to some extent controlled by human actions, but all of them also transpire inexorably regardless of what we do to promote or inhibit them. Other elements captured in this driver category have to do with the manifestations of forces of human nature (e.g., acceleration, international conflict, demassification, and diminution of a “command and control” mindset). These are, to some extent, also controllable and inexorable.

Driver 3: Ecosystem Consequences

The *degree* to which inexorable naturally-occurring phenomena affect human society. The element of predominant importance in this driver is climate change

- **Key assumption: beyond any behavior or application of knowledge, there is a level at which ecosystem phenomena cannot be controlled**
- **The driver encompasses, *inter alia*:**
  - **Phenomena stemming from forces of nature (climate changes, species evolution, compositional changes in natural elements, emergence of diseases, etc)**
  - **Unintended consequences of complex interactions between human actors and the broader ecosystem**
- **Dimensional antipodes are moderate / severe**

The term “Ecosystem Consequences” was chosen to characterize the third EPA WAP driver. The driver is defined in the text box of this slide.

“Ecosystem Consequences” is based on an understanding underlying the analysis -- and strengthened by that analysis -- that, no matter what actions we may take as individuals or as members of organizations, important manifestations of the forces of nature and the forces of human nature cannot be controlled. This driver has to do with the degree to which these inexorable phenomena impact the structures and constructs of our human societies.

“Ecosystem Consequences” is multi-dimensional and salient to the EPA. It encompasses the manifestations of the forces of nature (i.e., over time, the climate and the physical / chemical makeup of the earth and air and oceans simply change; evolution leads some species to extinction and gives rise to new species; diseases and plagues arise). It also encompasses the manifestations of forces of human nature (i.e., we create processes and institutions, driven in part by biological and neurological and emotional “programming” over which we have no control). The natural progression of these phenomena over time cannot help but have an impact on the quality, and perhaps ultimately the viability, of the societal constructs in which we live. We can and do act to insulate ourselves from these phenomena, but we can only succeed to some unknown extent.

This driver can be seen as a continuum. That is, the impact of naturally-occurring phenomena can be seen as “moderate” (i.e., our daily lives and our societal constructs are not dominated or threatened by the manifestation of the phenomena) or “severe” (i.e., our lives and societies must contend with the possibility of fundamental transformation as a result of their manifestation). Manifestation of this driver more toward one or the other of these antipodes of the continuum will result in very different futures for the society and very different roles, missions, and responsibilities for EPA.

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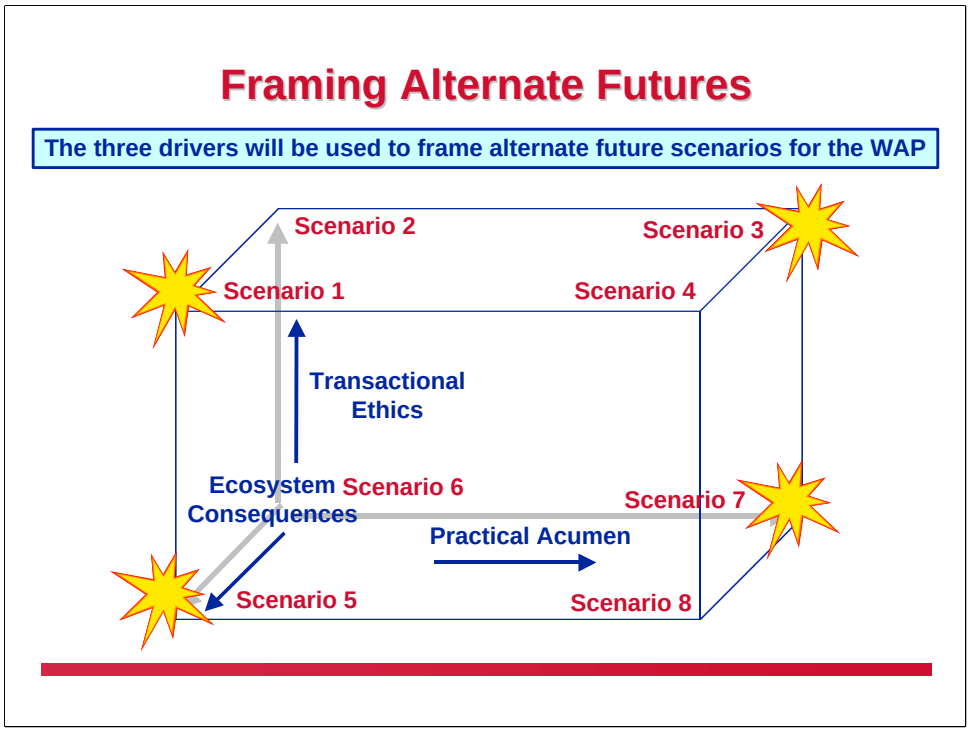
Drivers and Alternate Futures



The three multi-dimensional drivers defined and discussed in the previous section will be used as the foundational elements of the alternate future scenarios being developed in Task 3 of the WAP.

Our process for developing scenarios relies importantly on the interplay of multi-dimensional drivers once these drivers are defined.

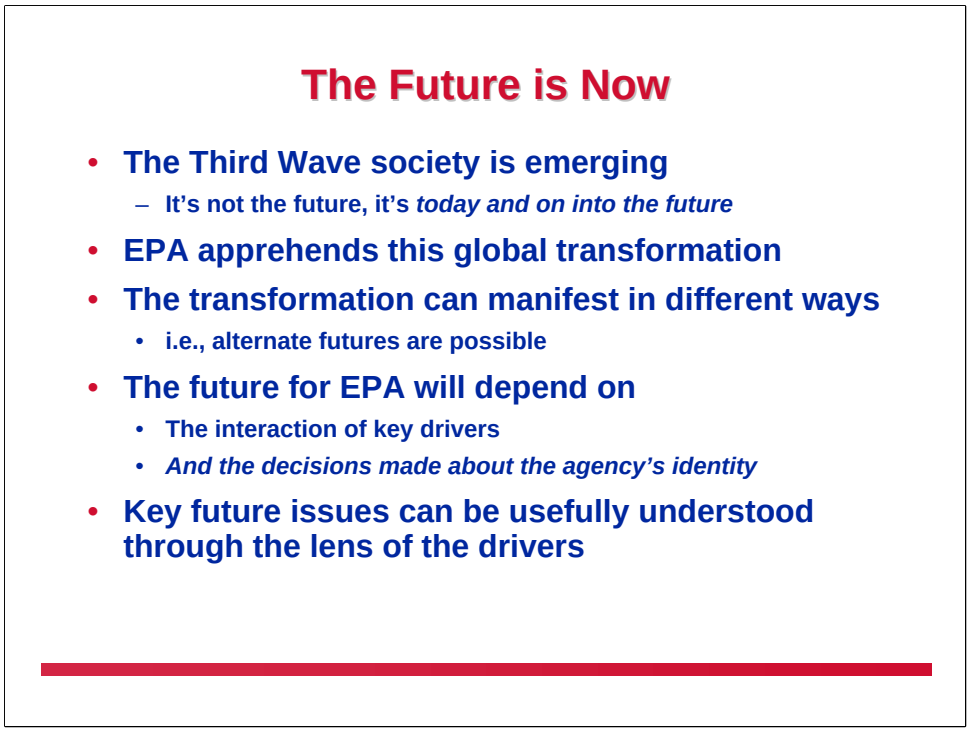
Each driver will be considered at its antipode (i.e., “high” Transactional Ethics, “low,” “leading” Practical Acumen, “lagging,” and “moderate” Ecosystem Consequences, and “severe”) and will envision all the possible antipodal combinations. The maximum number of combinations is eight.

Antipodes are used in order to paint pictures of worlds that are starkly different from one another. This intellectual artifice enables the subsequent analysis of the implications for EPA in each different world to be clear and incisive. In reality, drivers would more likely manifest at some interim point along the continuum between the two antipodes.

The enight combinations of driver antipodes will be used to envision what a world characterized by each particular combination might be like. For example, one consideration might be what a world be like in which, simultaneously, Transactional Ethics were “high,” Practical Acumen was “lagging,” and Ecosystem Consequences were “severe.”

Once the initial characterizations of the eight worlds were identified, four were selected which were believed to pose the most interesting and challenging implications for EPA planners.

Concluding Observations



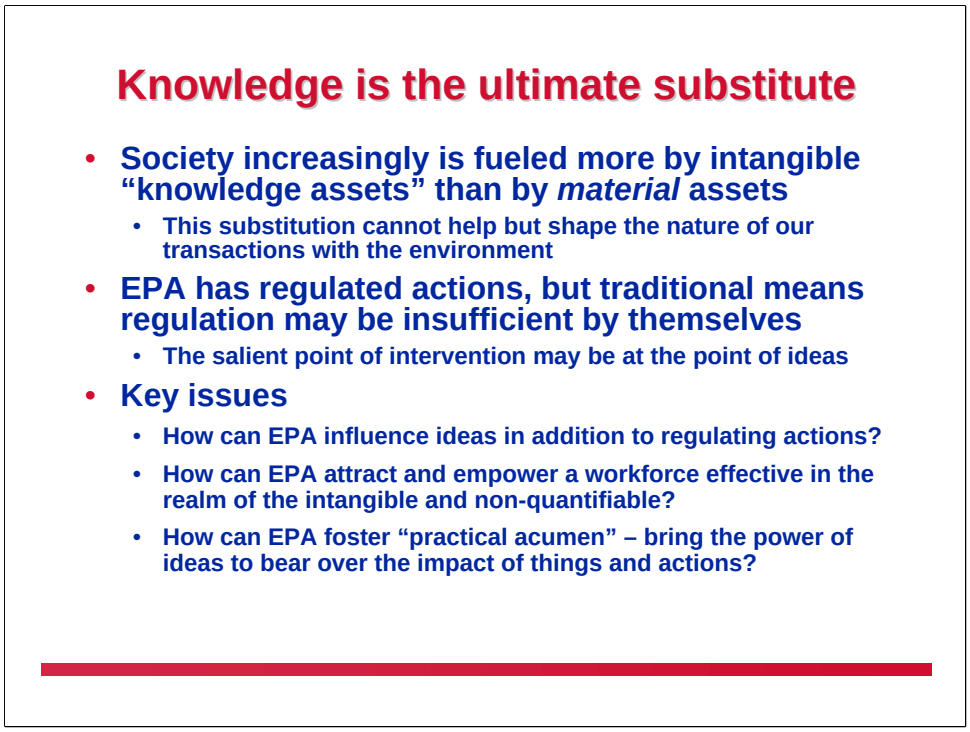
Alvin and Heidi Toffler have written for over twenty years about what they call "wave theory." Their premise is that human society has undergone three fundamental transformations, driven primarily by a change in how we make wealth. The "First Wave" was the transition from hunting and gathering to an agricultural society. The "Second Wave" was the transition from the agricultural society to the Industrial Revolution. The "Third Wave" is the transition we have undergone since approximately the 1960s as we move from a primarily industrial society into the Information Revolution.

The Third Wave society described by the Toffler's is not "the future" -- it is in the process of emerging today, therefore it is both the present and the future. Our economic, political, social, personal lives and institutions are already deeply affected by information technology and its applications, and they will become more so over time.

EPA appears to have a clear and growing understanding and appreciation of the transformation we are undergoing. This is manifested in many of its reinvention initiatives, in its increasing focus on stakeholder partnerships, and in new approaches it is promoting and developing for environmental protection.

A fundamental truth of societal transformation is that we cannot know how it will turn out, and we cannot assume it will be all good or all bad. Even a Third Wave future could turn out any number of different ways and still be a Third Wave future. Understanding some of these multiple possibilities is one of the primary values of what EPA is doing in Tasks 2 and 3 of the WAP -- identifying multi-dimensional drivers of change and using them to create a series of alternate futures to explore for their implications.

How the Third Wave manifests for EPA will depend on the combination of the interaction of key drivers and the decisions made about the identity, roles, responsibilities, and workforce of the agency in light of these drivers. Some fundamental issues and challenges emerge for the EPA and for environmental protection, regardless of the specific nature and characteristics of whatever Third Wave future emerges.



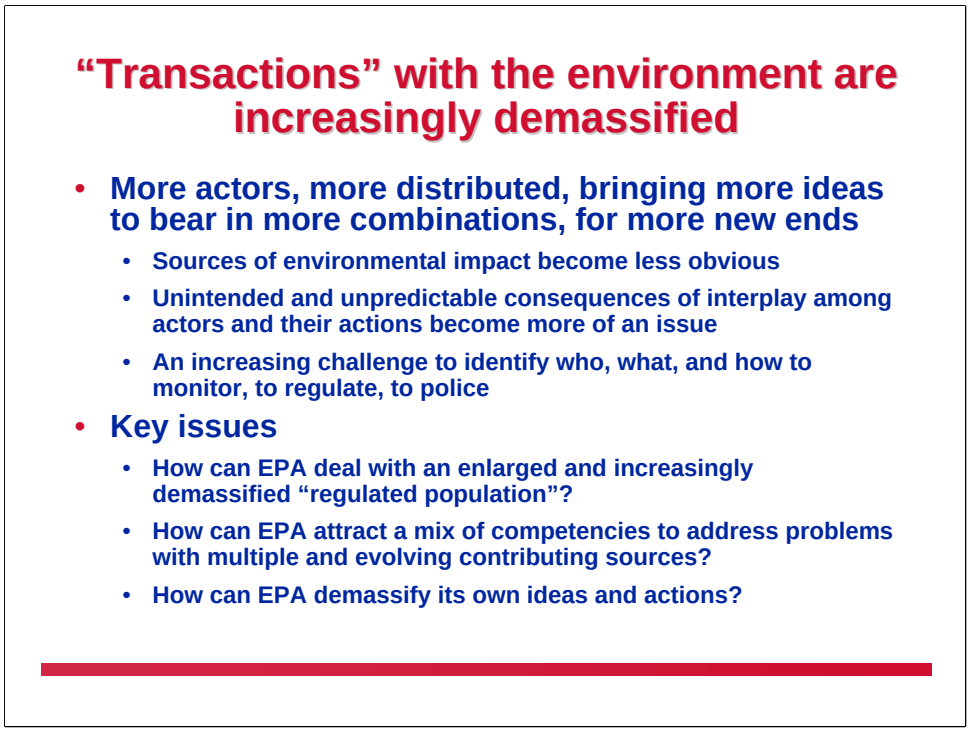
The issues and challenges outlined on this slide are linked to all the drivers, and particularly to Transactional Ethics. Given the increased importance of ideas and information in our transactions with the environment, we may see a decreasing relative importance in the workforce of people who think and work in terms of things.

For the EPA, this could mean a decreased need for experts in the physical characteristics of earth, water, air, and Super Fund relative to the need for people who understand the relationships among these things. Another way to frame the issue is in terms of people who understand quantifiable things (predominant in current EPA workforce) versus people who understand things that are inherently difficult to quantify (who may need to be more prominent in the future EPA workforce).

As the society comes to be fueled and valued more in terms of knowledge (e.g., the ideas, insights, information in employees' heads, and the patents they control) than in terms of hard assets (e.g., buildings, machines, stocks and inventory), it becomes more of a challenge to identify who or what to monitor, to regulate, to police, and how to do so. Traditional means of safeguarding the environment (and thus the competencies needed to effect these traditional means) may become insufficient by themselves – monitoring, regulating, and policing may well remain, but they themselves are likely to become less "tangible" and more knowledge-based.

Key challenges for the future EPA stemming from these issues include:

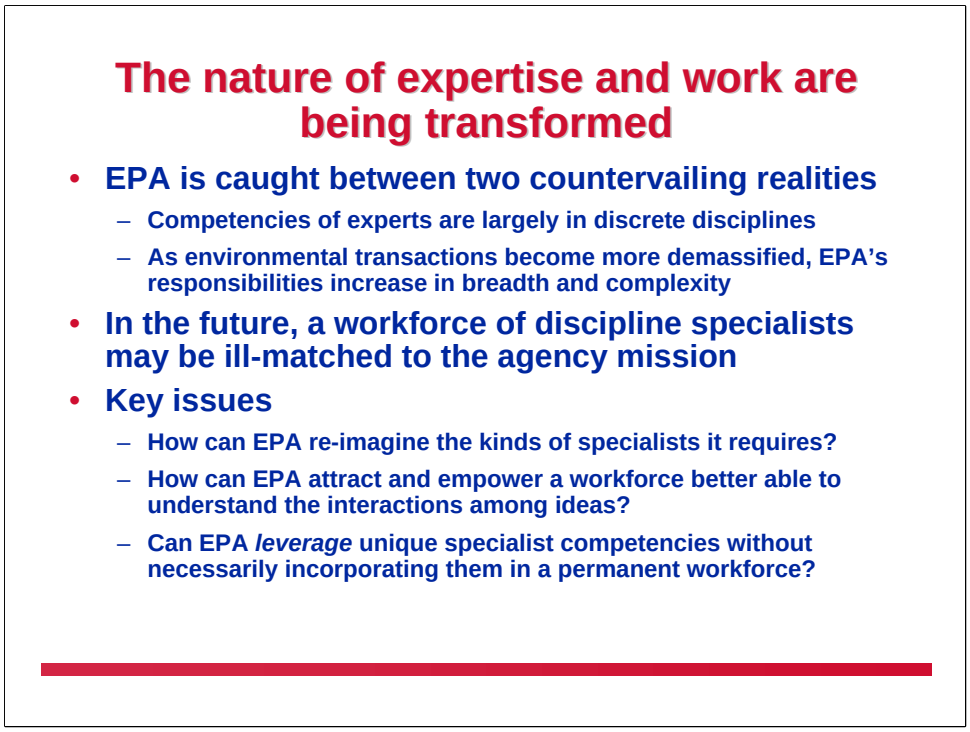
- how to build a workforce as supremely effective and qualified in the realm of the intangible and non-quantifiable as its current workforce is in the realm of the tangible and quantifiable;
- how to initiate the organizational and cultural transformation necessary to make such people genuinely effective and empowered in the agency; and
- how to focus less on the tangible assets that can be put against a problem (e.g., inspectors, technologies) and more on knowledge-based means of identifying and influencing the underlying sources of environmental problems.



The issues and challenges outlined on this slide are linked to all the drivers, and particularly to Transactional Ethics. The idea of demassification was introduced on slide 103. In the emerging society, everything is increasingly demassified -- there are more and more actors, fragmented and/or in more combinations, taking more and more different actions and generating more ideas that can, and do, have an impact on the environment. Potentially negative impacts on the environment are proliferating in number and complexity as the number and distribution and inter-connections of the sources of impact proliferate. The sources of environmental degradation become less obvious and harder to identify and control.

Key challenges for the future EPA stemming from these issues include:

- how to sort through all this demassification and understand what the problem sources, how to identify and understand solutions that address problems that most likely have multiple contributing sources and multiple, overlapping impacts;
- how to populate the agency with the right kinds of people in the right numbers and mix to make sense of an ever-growing and ever-changing assortment of inputs; and
- how to structure work practices to cope with complexity and demassification and have the right people focused on the right things at the right times.



The issues and challenges outlined on this slide are linked to all the drivers, and particularly to Practical Acumen. The EPA is faced with the challenge of two simultaneous and countervailing realities. On the one hand, discipline-based competencies become less broadly and usefully applicable as the nature of environmental problems and challenges become more complex and demassified. On the other hand, a large percentage of EPA's workforce are trained and expert in specific and narrow disciplines, and bridging these disciplines is inherently difficult.

EPA's responsibilities (i.e., protecting human health and the environment) are already broad and far-reaching, and they will only become more so. This suggests a greater need in the future for people who are extraordinarily and deeply skilled in multiple things and in understanding the connections between many things at once. Even if a larger workforce were an option, putting more specialists to work on problems that cut across areas of specialist expertise may not be effective.

Key challenges for the future EPA stemming from these issues include:

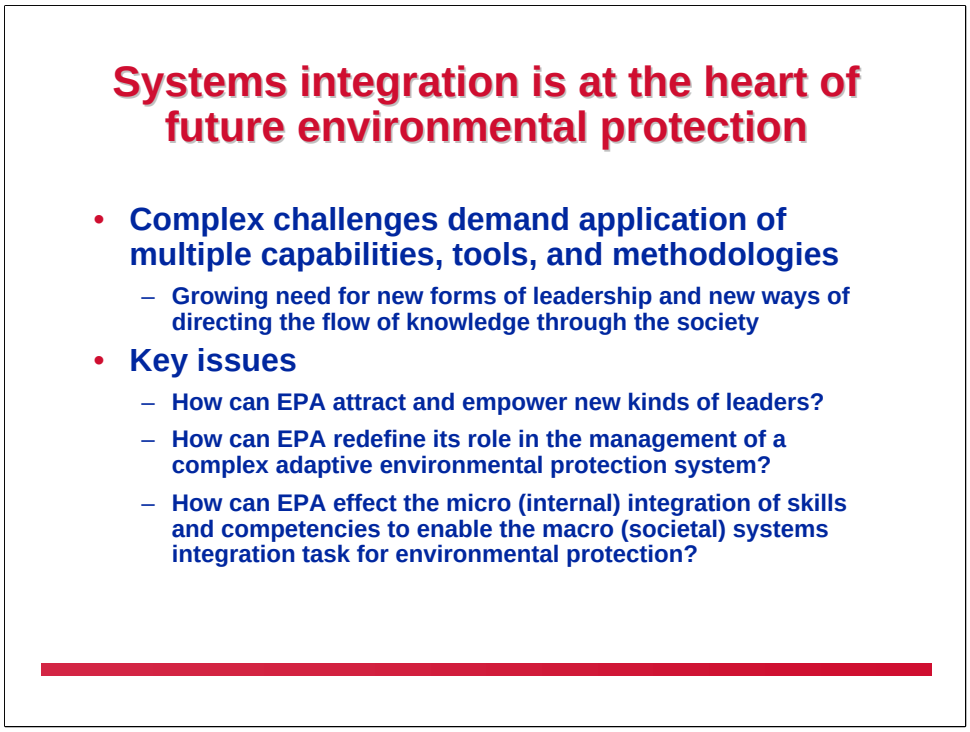
- how to redefine the very idea of "specialist" in the EPA context;
- how to identify and attract these "new" kinds of experts, especially in light of increased competition for human resources from the knowledge-driven private sector;
- how to effect the organizational and cultural transformation to accept and empower these "new" specialists, and how to acculturate them to the demands of the jobs they hire into at the agency; and
- how to continually reorient and recycle the workforce as specific skills and competencies become more or less important over time, especially in an agency where career-long employment is the norm.

The issues and challenges outlined on this slide are linked to all the drivers, and particularly to Practical Acumen. Social, economic, business, and other analysis all suggest that the key to an organization's success in the future, whatever "alternate future" emerges, will be innovation. The dynamic nature of the challenges and opportunities we face, and the constant deepening and broadening of the societal knowledge base, demand new ideas and, more importantly, new applications of ideas.

Government organizations historically are not well adapted to fostering innovation, examples of certain signal successes notwithstanding. This is generally true both in terms of their own practices, and in terms of the environment they foster around their area of responsibility. As environmental problems become more complex, the premium on EPA developing innovative solutions and fostering the growth of such innovation in the regulated community will increase.

Key challenges for the future EPA stemming from these issues include:

- how to construct and populate an organization structurally challenged in terms of fostering innovation so that it becomes a primary spur to development of innovative new environmental protection means and methods;
- how to grow a culture of innovation the EPA workforce given the bureaucratic nature of the organization, and given the demographics and predilections of that workforce (i.e., a significant percentage of career-long "life employees");
- how to establish and foster relationships with, and how to learn from, other organizations that are innovators, and how to use its position in these relationships to spur further innovation in the partner organizations; and
- how to identify, understand, and develop the skills and competencies in the EPA workforce to make such relationships and matrix organizations work.



The issues and challenges outlined on this slide are linked to all the drivers, and particularly to Ecosystem Consequences. The increasing complexity and increasingly inter-related nature of current and future environmental challenges has been raised a number of times in this report. It can be seen as a force or nature and of human nature. It is not only the environmental problems themselves that are inter-related -- it is also, and perhaps more importantly, the system within which EPA works. The system comprises not only technologies and methodologies for mitigating environmental problems, but also numerous societal, economic, governmental, international, and other actors, each with their own unique interests and competencies.

Environmental protection in any future will demand the integration and application of multiple capabilities, methodologies, tools, human, and other resources. Making all the pieces work harmoniously and synergistically; sorting out the responsibilities to minimize overlap and/or counter-productive or mutually-canceling actions; maximizing effectiveness; ensuring nothing significant is overlooked -- all of this will be an unprecedented systems integration task that will only grow more complex over time.

Key challenges for the future EPA stemming from these issues include:

- how to develop and strengthen new kinds of leaders and other necessary competencies to envision, orchestrate, and manage such a high order of systemic integration;
- how to manage the extraordinary volumes of information that will need to pulse through the organization to enable the system integration; and
- how to effect the organizational and cultural transformation to overcome traditional bureaucratic practices inhibiting system integration.

The issues and challenges outlined on this slide are linked to all the drivers, and particularly to Ecosystem Consequences. Time and speed are arguably among the most critical variables in the emerging Third Wave society. The Toffler's have suggested that, increasingly, every interval of time is worth more than the one which came before it. The ever-increasing salience of time can be seen as a force or nature and of human nature.

The salience of time extends as much, or more, to environmental protection as it does to anything else. The concepts of "real time" and "simultaneity" need to be understood for their environmental implications. To put it simplistically but starkly, with species becoming extinct every day, with new threats and dangers emerging (or least being discovered or understood) rapidly and unexpectedly, acceleration is of profound importance when viewed in light of environmental protection. The acceleration of change, both positive and negative, demands faster development of solutions (e.g., technology, policy, other) to environmental problems, faster decision-making, and reductions in decisions-in-process.

Key challenges for the future EPA stemming from these issues include:

- how to succeed in being simultaneously proactive and reactive in response to the pressures and threats stemming from acceleration;
- how to develop the skills and competencies to cope with acceleration while still ensuring depth and comprehensiveness of analysis and solutions; and
- how to effect the organizational cultural transformation to cope with acceleration despite the constraints of traditional bureaucratic and command-and-control practices.

Alternate Future Scenarios Report

Workforce Assessment Project -- Task 3

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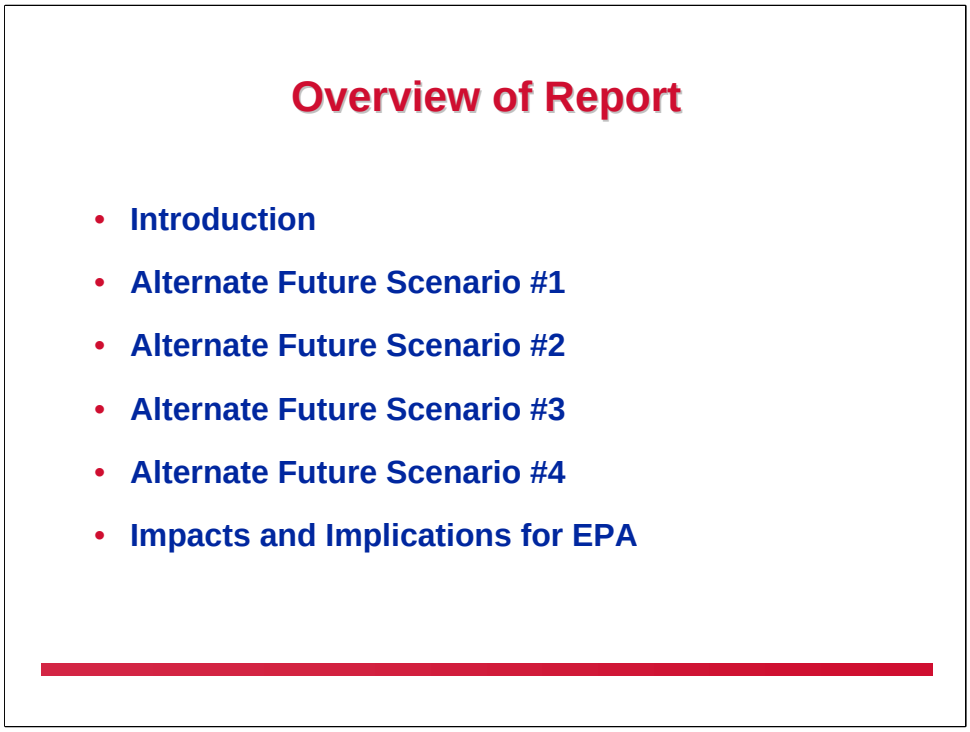

This report represents the product of Task 3 of the EPA Workforce Assessment Project (WAP), focused on developing a series of alternate future scenarios based on the multi-dimensional drivers of change identified in Task 2. It is constructed as a briefing slide presentation with annotation text. The majority of the "story" for each scenario is told on the slides. Some additional clarification of the ideas on the slides are provided in the annotation text.

Following the introduction, each subsequent section of the report tells the story for one of the four selected alternate future scenarios. For each scenario, key features of the notional world are described. The following categories are used as an organizing principle for the features described:

- Domestic Politics
- International Politics and Economics
- Social Environment and Demographics
- Technology Environment
- Environment and Related Issues
- Work-Related Issues (General and Government-Specific)

The final section of the report outlines some of the key impacts and implications of each scenario for the EPA, its future mission, and its future workforce competency requirements. The intent is to imagine each world as described and stimulate thinking about how the EPA of today would fare in it, and how it would need to adapt in order to be effective.

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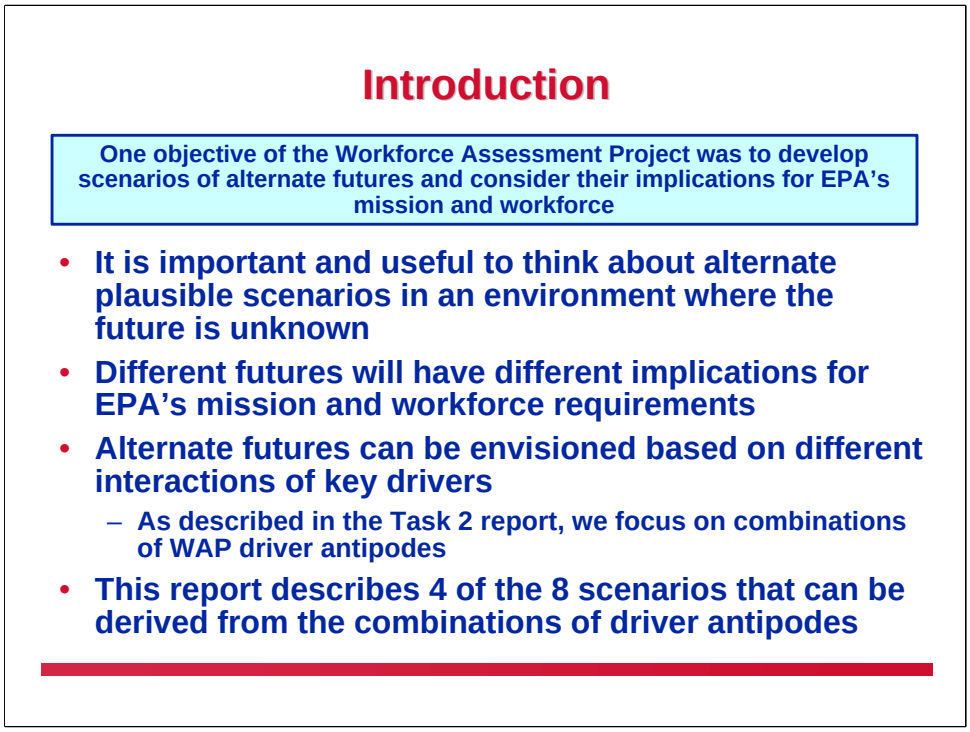
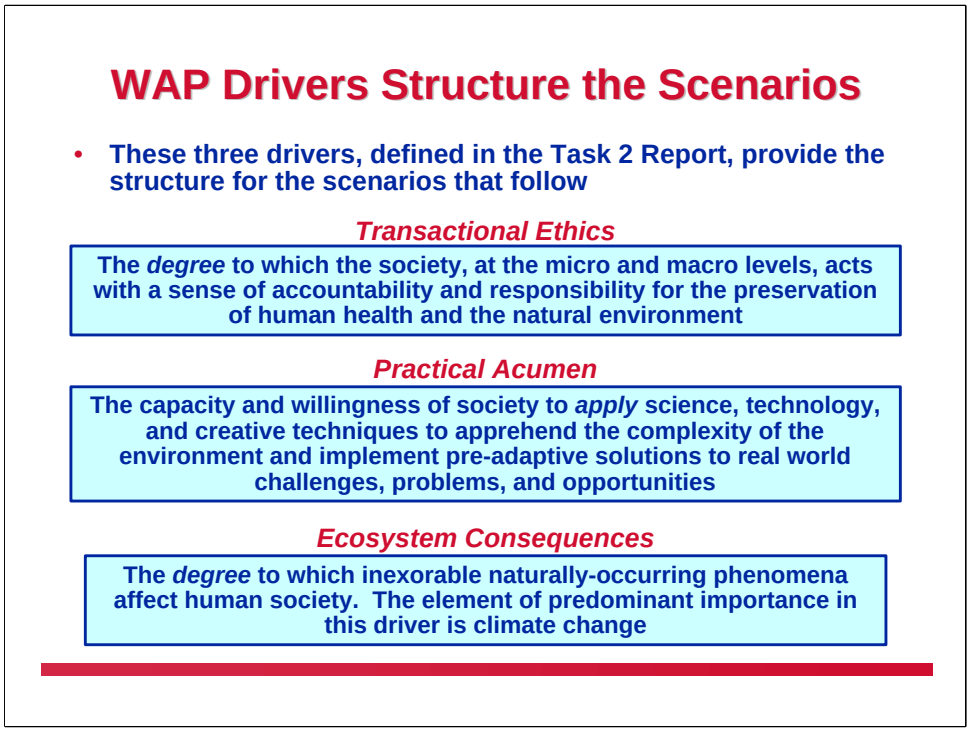
Introduction



This report presents descriptions of four alternate future scenarios that pose interesting challenges, impacts, and implications for the mission and the workforce competency requirements of EPA.

The exercise of creating and exploring alternate future scenarios is a useful one because, no matter how good our insight and our information about trends, developments, and other factors, we cannot know how the "real" future will emerge. Consideration of alternate futures, based on a a thoughtful process to identify key forces that can be reasonably expected to drive change, enables an organization to gain insights that can later be reviewed and assessed in light of how the "real" future actually is emerging. Any future we can envision will pose different implications for an organization -- some implications may be the same in more than one scenario, but no two sets of implications will be precisely the same for any two scenarios.

The process undertaken in Task 2 of the WAP, in which we identified three multi-dimensional drivers for the EPA, forms the basis of the scenarios described in this report. As discussed in detail in the Task 2 Report, our process for scenario development focuses on how the extreme manifestations (or "antipodes") of the three drivers could combine with one another, and then imagining the features of a world characterized by each of the eight possible combinations of antipodes. After consideration of the eight possible combinations, we selected four scenarios for further development and articulation.



This slide introduces the three multi-dimensional drivers identified in Task 2 for the EPA WAP. Detailed discussions of these drivers is in the WAP Task 2 Report; those discussions are excerpted below.

"Transactional Ethics" is based on an understanding we arrived at in our analysis that, in an important sense, every action we take, as individuals or as members of organizations (e.g., businesses, polities, households) are transactions with the environment. To a greater or lesser extent, everything we do affects the environment in some way. This driver has to do with the extent to which individuals are responsible or ethical in those transactions -- are we thinking primarily and expansively of the benefit to both sides in these "transactions," or are we thinking primarily and narrowly of ourselves?

"Practical Acumen" is based on an assumption underlying our analysis -- and strengthened by that analysis -- that the knowledge base of the human society will expand continually. The natural curiosity of humankind cannot help but lead to continual new discovery and understanding of the world around us and the ways in which we can shape that world. This driver has to do with what we do with our knowledge, and how effective we are able to be in doing with it whatever we elect to do.

"Ecosystem Consequences" is based on an understanding underlying our analysis -- and strengthened by that analysis -- that, no matter what actions we may take as individuals or as members of organizations, important manifestations of the forces of nature and the forces of human nature cannot be controlled. This driver has to do with the degree to which these inexorable phenomena impact the structures and constructs of our human societies.

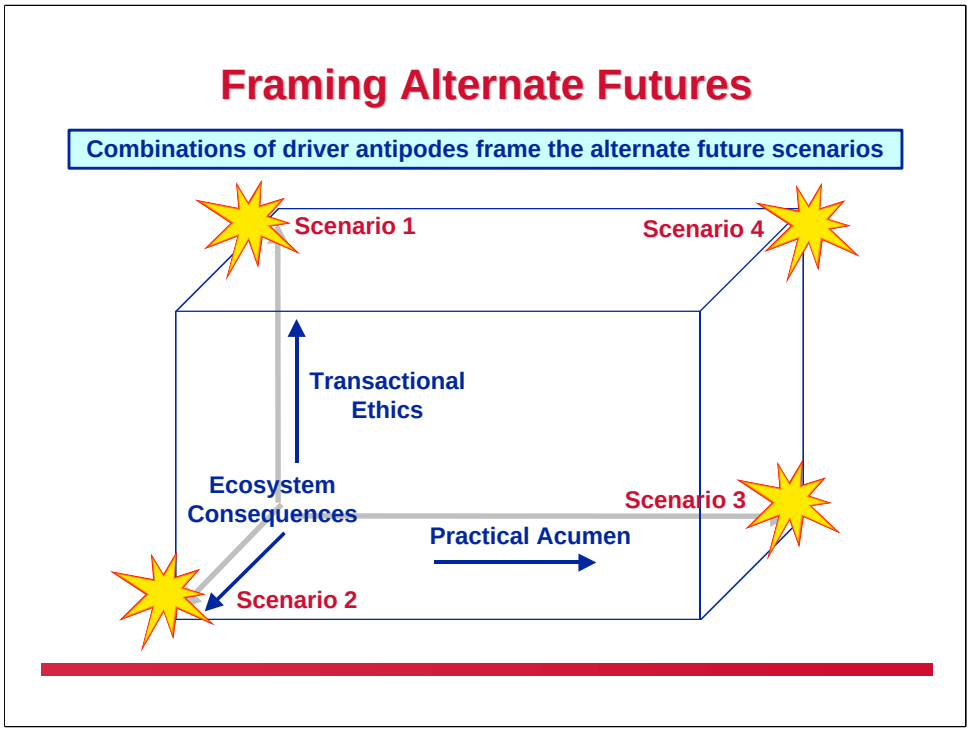
Driver Antipodes Define the Scenarios

- **Each driver can manifest at either extreme or "antipode," or anywhere along the continuum between the antipodes**
  - **Transactional Ethics (TE) can be "high" or "low"**
  - **Practical Acumen (PA) can be "leading" or "lagging"**
  - **Ecosystem Consequences (EC) can be "moderate" or "severe"**
- **The scenarios were developed with a focus on combinations of the antipodes of the drivers**
  - **This artifice makes the scenarios starkly different from each other**
  - **Sharp, incisive implications can then be drawn**
- **The selected combinations of driver antipodes are :**
  - **Scenario 1 : TE high … PA lagging … EC moderate**
  - **Scenario 2 : TE low … PA lagging … EC severe**
  - **Scenario 3 : TE low … PA leading … EC moderate**
  - **Scenario 4 : TE high … PA leading … EC moderate**

Each driver can be seen as a continuum. Each can manifest at one extreme (antipode) or the other; more likely, each would manifest somewhere along the continuum. For example, Transactional Ethics could be "high" (i.e., we are very mindful of the ethics of our transactions with the environment) or "low" (i.e., we do not behave with a great deal of accountability in these transactions). Practical Acumen could be "leading" (i.e., out in front of the issues against which the knowledge base is applied) or "lagging" (i.e., reactive to these issues rather than out in front of them). Ecosystem Consequences could be "moderate" (i.e., our daily lives and our societal constructs are not dominated or threatened by the manifestation of the phenomena) or "severe" (i.e., our lives and societies must contend with the possibility of fundamental transformation as a result of their manifestation).

The intent of our focus on the extremes or antipodes of the drivers in developing scenarios is to paint pictures of alternate future worlds that are sharply different from one another. We would not assert that the "real" future will look like the combination of any of the extremes of the drivers. However, we believe it is most useful for planners to focus on scenarios that are clearly differentiated from one another and that are more toward the extremes of what is possible. By doing so, insights can be gained that can later be applied to the less extreme "real" future, however it may emerge.

We would also not assert that any of the scenarios we have created are more or less *likely* than any of the others; as suggested above, the future is unknowable. Likelihood is not relevant here, given that the objective of the exercise is simply to stimulate thinking about possibilities and implications. What we assert is that the scenarios as described are plausible, and that each is more or less internally consistent. The "real" world may look relatively more like one of these scenarios than another, but more likely will look like a combination of the features in more than one. By looking at the implications of four extreme but plausible scenarios, EPA will be well positioned to look at the features of whatever "real" world that emerges and think back to what was learned in the analysis of each of these scenarios, to see how the insights can be adapted to the real world challenges they face.



This slide is taken and adapted from the WAP Task 2 Report entitled "Environmental Scan and Drivers of Change." It is intended to depict graphically how the eight combinations of driver antipodes can be used to envision eight starkly different scenarios. We have selected the four scenarios out of eight that we believe pose the most interesting and challenging planning, mission, and workforce implications and impacts for the EPA. These are the driver antipode combinations noted on the previous slide. The first scenario combines high Transactional Ethics, lagging Practical Acumen, and moderate Ecosystem Consequences. We believe this poses interesting challenges for the EPA primarily because the society's ability to put its knowledge base to work is out of sync with the good intentions of the people. The reasons for this disconnect are explained in the description of the scenario.

The second scenario combines low Transactional Ethics, lagging Practical Acumen, and severe Ecosystem Consequences. We believe this poses interesting challenges for the EPA because it demonstrates that, even when all three drivers appear to be taking a "negative" manifestation, there are positive attributes and effective steps that EPA and other agencies can take.

The third scenario combines low Transactional Ethics, leading Practical Acumen, and moderate Ecosystem Consequences. We believe this poses interesting challenges for the EPA because the apparent conundrum of a relatively careless population and a healthy, vibrant environment forces us to consider in new ways the role and utility of the EPA as we know it today.

The fourth scenario combines high Transactional Ethics, leading Practical Acumen, and moderate Ecosystem Consequences. We believe this poses interesting challenges for the EPA because it, in a sense, represents a "dream world," one where everything appears to have turned out as we would want it to. Like the third scenario, such a world forces us to consider in new ways the role and utility of the EPA as we know it today.

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Alternate Future Scenario #1

Transactional Ethics are high

Practical Acumen is lagging

Ecosystem Consequences are moderate

Scenario #1

Domestic Politics

- **Federal level government agencies are overshadowed by highly empowered micro-local (sub-neighborhood) entities**
- **Micro-local entities have many overlapping responsibilities and tend to counteract each other's effectiveness**
- **The shift in accountability to the micro-local level has led to a renewed public spirit about government**
- **Government overall is huge, but each micro-local entity is quite small**
- **Relationships between Federal agencies and lower levels of government are fiercely competitive and combative**
- **Most important / valued Federal agency is the Department of Community Development, formerly HUD**
- **Most stringent laws are around zoning**
- **Congress is highly responsive to the priorities of all the micro-local entities, leading to gridlock at the national level**
- **Taxation is mostly in the form of dues (e.g., school, property)**
- **"Activism" is seen as unnecessary -- people naturally rally around narrowly defined community interests**

The key feature characterizing this world is fragmentation into small, largely self-centered communities and "micro-communities." While the micro-communities generally are not in direct conflict with one another, neither is there very much cooperation or empathy. This fragmentation has a significant impact on how domestic politics is structured and conducted. Federal and state agencies remain but are not nearly as important as local and sub-local entities. Sub-local agencies in all the many communities deal with the same kinds of issues and responsibilities, but from the narrow perspective of their specific "micro-community." The result is generally a great deal of overlapping activity. Often, the actions of one such entity bump up against and/or cancel out the effects of another, neighboring entity's actions. Despite this, people are generally enthusiastic about how responsive their government representatives are.

Scenario #1

International Politics, Economics

- International affairs are conflictual and "tribal" in nature, driven more by pride than substantive issues
- Key international issues: cross-government structural disharmonies; terrorism; human resource competition (i.e., "brain drains"); and ineffective international organizations (e.g., the UN)
- Militaries in industrial nations rely on high-cost, high-tech systems manned by small forces
- U.S. economy is service-driven; healthy but not growing strongly
- Key industry sectors: services, health, communications, financial, software
- The nature of economic competition within the U.S. is fragmented but highly entrepreneurial
- Little competition within U.S. for "knowledge workers" due to people's desire to keep jobs within "micro-local" economies
- Gap between "have" & "have nots" diminished via attentive social services from micro-local governments and charities

The lack of cooperation and empathy from community to community within the US is mirrored in international relations to some extent. That is, nations tend to have a very individualistic stance -- here again, while open conflict is not frequent or endemic, there is little effective diplomacy or cross-border collaboration on issues of mutual concern.

The economy in the U.S. is growing moderately and is largely fueled by service industries. Competition is between micro-communities, as each of these communities seeks to keep their economic activities as close to home and internally integrated as possible. The result is a great deal of redundancy in the economy when looked at from a national perspective (but no one really looks at it this way), which is one of the factors inhibiting more vibrant growth.

Scenario #1

Social Environment, Demographics

- **Education emphasizes liberal arts over science -- courses of study in all grades are highly eclectic**
- **The primary "glue" of U.S. society is people's service obligation to their "micro-community" organizations and neighbors**
- **Non-traditional family structures predominate and proliferate**
- **Social services are very informally administered, and entirely at the micro-community level -- "everyone helps each other"**
- **Diversity (e.g., racial, ethnic, gender) is a non-issue within each micro-locality -- "every community its own rainbow"**
- **Media (e.g., print, TV) demassified, competitive, cacophonous**
- **The preferred vacation activity is to stay at home -- extra time to work in the community**
- **Population growing steadily -- aging offset by climbing birth rates**
- **Periodic population mobility as people form new communities**
- **Cities emptying as people move to once-wide-open spaces**

People's sense of their social environment, like everything else, is centered on their micro-communities. There are effectively no national educational standards; people are reasonably well educated, but people and communities design and focus their educational curricula in very idiosyncratic ways. Social services are not a major component of government activity even at the micro-community level; people tend to look out for one another in the neighborhood. The value of diversity is well appreciated, but is seen from a very local perspective rather than a national one.

Demographically, the overall national population is climbing steadily even as people try to be mindful of the impact of more people on their local communities. People increasingly are moving away from the cities to form new communities in suburban and rural areas.

Scenario #1

Technology Environment

- **The U.S. remains a technology development expert, but it is no longer a cutting edge leader**
- **The primary technology development focus is marginal improvements in existing fields of expertise**
- **Software development is still a strong suit, but the U.S. market niche is periodic upgrades, not new applications**
- **Multiple local Information Technology (IT) standards, not national ones -- system and network effectiveness is hampered by a need for per-use configuration**
- **Environmental technology development is reactive (e.g., reclamation, clean-up) more than proactive**
- **Transportation systems are modern but not innovative (i.e., rely on multi-modal system, with transfers at every community border)**
- **Space technology is seen as "too macro" for any community to be very interested**
- **Integration of technology fields suffers due to lack of cooperation across communities**

Technology development remains reasonably strong in the U.S., but because economic activity is so focused at the micro-level, from a macro national standpoint we have lost leadership ground to other nations. Advances tend to be improvements on existing technologies and applications (albeit frequently significant improvements) more so than novel new products and applications. The advanced application of information technology has been somewhat stymied by the absence of national standards; it is a challenge to make systems "talk" to one another effectively. Development of specific technology and industry sectors generally reflects the trends described here of being reactive, incremental, and focused on a small scale.

Scenario #1

Environment and Related Issues

- **The health and vibrancy of the environment is good at the micro-community level, but is suffering at the macro level**
- **The health of the macro-environment is fragile -- no pressing current threats, but potential for problems is high**
- **Natural resources are diminishing imperceptibly from a "tragedy of commons" effect**
- **The popular attitude toward the environment is very self-centered -- "this is our environment, that one's yours"**
- **EPA maintains titular responsibility for national environmental health but all program implementation is at micro-local level**
- **Key environmental challenges / threats:**
  - **Unforeseen consequences of community activities**
  - **Biodiversity loss**
  - **Unprecedented effects of biotechnology on natural systems**
  - **Unappreciated resource depletion**

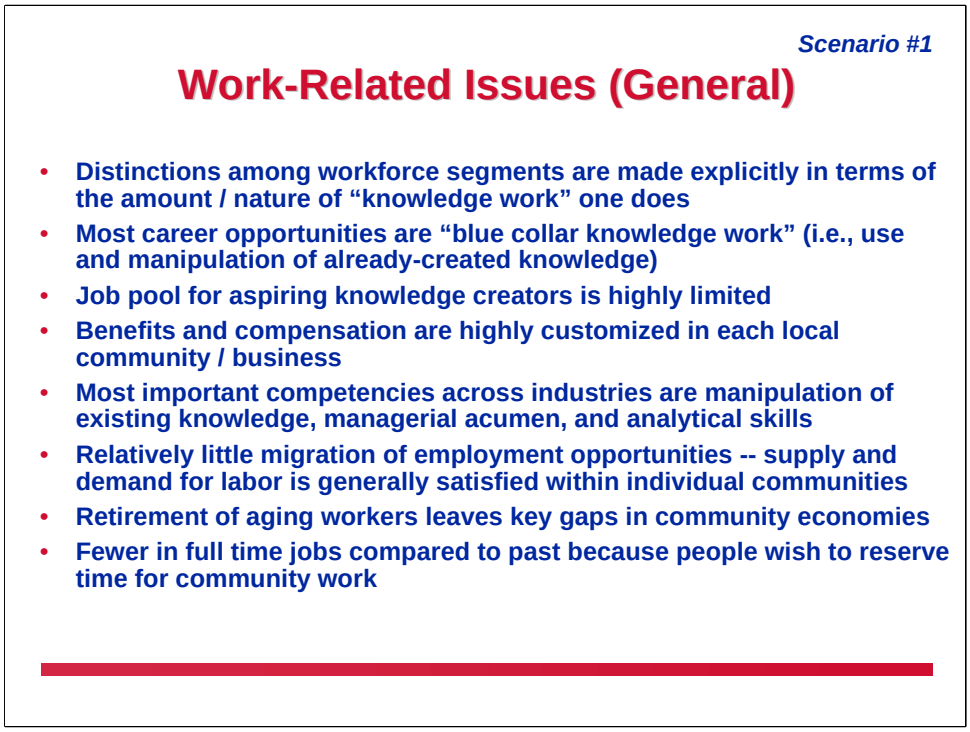
The fragmentation of the nation into self-centered communities has had a perverse effect on the environment akin to what was once described as the "tragedy of the commons." That is, while everyone is conscientiously focused on the health and preservation of their very local environment, few pay much attention to the common national heritage, and actions that could have wider-than-neighborhood impact are thought of only in terms of how these impacts can be mitigated close to home. While the environment is not being rapidly or dangerously degraded from the macro / national standpoint, neither is it being attended to, and effects are starting to be seen by those who care to look. The national-level EPA remains but is more of a watcher than an actor, as protection initiatives are implemented at the very local level.

Scenario #1

Environment and Related Issues

- **Large-source air pollution largely a thing of the past -- multiple small sources a major problem**
- **Watershed approach has been a profound failure due to lack of cooperation among multiple stakeholders**
- **Food safety issues are a major unknown -- greatly diminished use of pesticides, but no national-level pesticide regulations in place**
- **Waste treatment and site contamination is a growing danger as individual communities pursue idiosyncratic solutions**
- **U.S. participation in international environmental protection efforts dramatically reduced from circa-2000 levels**
- **EPA makes massive amounts of environmental information available but people pay more attention to local info sources**
- **Labyrinth of micro-local laws / regulations makes "compliance" easy to avoid for those who want to**

Some of the specific environmental issues and challenges of this world are outlined on the slide. The mix of issues is intended to suggest that, regardless of the nature and characteristics of the world, there will be "good news" and "bad news" developments and issues alongside each other.



Given the focus of the WAP on workforce competency requirements and issues, each scenario describes some features of the world with regard to these issues.

In this world, "knowledge work" is the most important kind of work, much more so than other types of work (e.g., manufacturing). This is reflected in the key industry sectors noted on slide 150. The workforce tends to be "segmented" in terms of the kinds of knowledge work different people do. People think in terms of four general categories: those who create new knowledge; those who develop novel new applications of knowledge; those who use the knowledge and applications of knowledge created by others; and those who primarily manipulate the data and information that in part comprises knowledge. Most of the population is employed in the latter two categories, in jobs that are euphemistically referred to as "blue collar knowledge work."

The key competencies in this world, cutting across most industries and jobs, are noted on the slide.

As noted above, because many community-centered "micro-economies" exist, job opportunities tend to be local in nature and people like it this way. A downside of this is the skill gaps that are left when older people stop working. There are fewer and fewer who work full time, as many prefer to spend more time doing community service work.

Scenario #1

Work-Related Issues (Government)

- **Government's greatest need is for fast-reacting problem-solvers and consultants**
- **Ability to manage liaison among the micro-local communities is important but not well developed**
- **Career civil servant culture has diminished -- few wish to pursue careers in service to the nation**
- **Technical advisors to communities are retained at Federal level, but the need for such advice is diminishing**
- **Understanding of commercial perspectives relatively unimportant as Federal government has little control over businesses**
- **Attraction and retention of technical experts and managers is exceedingly difficult**
- **Pool of engineers and scientists to choose from for technical advisory roles is limited**
- **Women are in high demand in the government workforce for their management and communication-social skills**

Because the country is so fragmented, those in the government (primarily Federal) who have to think about the larger picture need to be able to identify problems before those in the micro-communities are likely to perceive them as problems. To the extent that liaison among all the micro-community government entities is seen as necessary, responsibility for this falls to Federal managers who are generally not well versed in the required skills.

Because the primary allegiance of most people is to their local community, there are fewer and fewer people interested in career Civil Service jobs that could focus their attention somewhere other than their community. Those who do elect to work for the Federal government are becoming harder to hold on to, as the call of the community increases in volume. Increasingly, even the most technical aspects of community maintenance and management are devolving to the local level, making technical experts less necessary at higher levels of government.

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Alternate Future Scenario #2

Transactional Ethics are low

Practical Acumen is lagging

Ecosystem Consequences are severe

Scenario #2

Domestic Politics

- **The nature of government is labyrinthine and the primary focus of government agencies at all levels is regulation**
- **People expect / welcome this widespread, pervasive oversight**
- **Government is overwhelmed with competing obligations / responsibilities**
- **Government is big and getting bigger (e.g., new agencies and departments)**
- **Relationships between Federal agencies and lower levels of government are complex and highly bureaucratized**
- **Most important / valued Federal agency is the Department of Labor**
- **Most stringent laws are around family issues**
- **Congress is characterized by bickering, pork-barreling, and obligations to industry interests**
- **Activism is not seen as effective or worthwhile by either individuals or the Government**
- **Taxation on individuals is minimal -- the primary obligation is on businesses and business / social processes**

The key feature characterizing this world is the large size and plodding, bureaucratic nature of things. The conduct and structure of domestic politics is the most obvious, but by no means the only, manifestation of this characteristic. The government employs well more people and has well more agencies, departments, etc than it did at the turn of the century. All the agencies at each level and across levels get along all right, so long as the appropriate paperwork is filled out. Family and work are the primary concerns of government and of the people government represents, but government has a highly intrusive, highly regulatory, command-and-control role in many areas in the name of family and work. The complex and daunting nature of the world is such that people are quite at ease with the government having such a significant say in how things are done.

Scenario #2

International Politics, Economics

- **The nature of international affairs is volatile, driven by economics and social disparities between nations**
- **Key international issues: stability of global system; clashes between have-and-have-not nations; and economic protectionism**
- **Militaries in industrial nations rely on legacy forces, systems, and approaches to traditional national security interests**
- **U.S. economy is deflated, volatile, sapped by regulation, and dominated by a few industry sectors**
- **Key industry sectors: manufacturing, agriculture, primary products from extracted resources, Information Technology (IT) hardware**
- **Economic competition within U.S. is constrained by dominance of a few large companies in the key industry sectors**
- **The competition for "knowledge workers" is fierce, constant, and high-stakes, because their numbers are few compared to "data workers"**
- **The gap between "have" and "have nots" is stable, but neither group is doing especially well**

The complex and daunting nature of the world plays out on the international stage as well as the domestic stage. Every nation is continually jockeying for position with every other nation It makes for a volatile and generally unstable state of international affairs. When problems arise they tend to be acute and they tend to arise suddenly, although as in the first scenario, the result is tension much more frequently than it is open conflict.

The U.S. economy is not in very good shape. Growth has been essentially flat for some years, partly due to the extensive regulation and oversight with which businesses and industries must contend. The primary fuel of the economy is what the Toffler's would characterize as "Second Wave" industry (e.g., manufacturing, resource extraction). Even the information technology component of the economy is more Second Wave than Third Wave (i.e., computer hardware much more than software and applications). In each of the major industries, a few large companies dominate their many smaller competitors. To the extent that knowledge workers are important in these industries, the competition for these workers is intense, because the dominant companies want to ensure their edge against their few but powerful competitors.

Scenario #2

Social Environment, Demographics

- **Education for many is via the "school of hard knocks" -- vocational, craft-focused, neither science nor liberal arts**
- **Primary "glue" of U.S. society is the bond of workplace and the bond of family**
- **Resurgence of the nuclear family characterizes society**
- **Social services are in high demand but low supply due to competing obligations of government entities**
- **Diversity (e.g., racial, ethnic, gender) issues subsumed under primary social class identification**
- **The media is monolithic -- few voices, few viewpoints**
- **Preferred vacation activity is visiting the few, crowded state parks**
- **National population growing fast despite tough times due to value placed on nuclear family**
- **Aging population is a major burden on government and young families**
- **Population mobility is significant as families move to pursue new economic opportunities**
- **Major cities keep growing as key industry centers**

As noted, the family and the workplace are at the center of people's social universe. Times are tough and people value greatly the stability they find in these primary institutions. Education is geared toward getting a good job, not developing a fulfilling and stimulating career. Given the deflated state of the economy, the demand for social services to fill the gaps is high, but the government faces so many competing demands and is so focused on regulating the economy and social dynamics that the supply of these services generally leaves people under-fulfilled. People's sense of diversity is much more economically based than based on ethnicity, gender, or other diversity areas. The media is one of the industries that is dominated by a handful of mega-companies, so the diversity of available viewpoints is limited.

Despite the challenging economic times, population growth is significant; as suggested, people treasure the fulfillment of their families as an antidote to the struggle of finding fulfillment elsewhere. The nuclear family has seen a resurgence, but these families are burdened with the responsibility of contributing to the care of their parents, who have retired and can get only limited services from the government. Urban growth continues apace as people flock to the cities to work for the leading companies of the key industries.

Scenario #2

Technology Environment

- **U.S. technology development exhibiting a slow pace of growth**
- **High-tech systems / technologies are not well integrated throughout society**
- **Information Technology (IT) is pervasive but low quality, minimally innovative -- a commodity**
- **Development of environmental technology is not a high priority except for a few companies**
- **Government Research and Development (R&D) dramatically reduced relative to circa-2000**
- **Transportation technology sector is stagnant -- U.S. imports trains, planes, and automobiles**
- **Commercial space sector never took off -- telecom and other applications rely on circa-2000 legacy systems**
- **Technology for more efficient exploitation of natural resources is one of the few bright spots for U.S. industry**
- **Energy technology primarily focused on improving fossil fuel yields**

Like the broader economy, technology development in the U.S. is exhibiting essentially flat growth. The high-tech products that are developed and those that are imported from the leading R&D nations are not very well integrated throughout the society; stand-alone and proprietary systems are the norm. Government funding of R&D faces more competition every day from social service demands and the need to throw more people at the regulatory problems.

Information Technology (IT) has trickled down to most of the population, but most of us are still using Windows 95. Development of other specific technology and industry sectors is described on the slide and generally reflects the trends described throughout this scenario of slow growth and a dearth of innovation.

Scenario #2

Environment and Related Issues

- **Natural environment is steadily being degraded despite regulation by multiple levels of government**
- **Natural resources severely depleted by "Second Wave" economic activity of big companies in key industry sectors**
- **The popular attitude toward the environment is resignation -- "what can you do about it?"**
- **Key environmental challenges / threats :**
  - **Climate change effects**
  - **Major natural resource depletion**
  - **Ecosystem fragmentation**
  - **The old stand-by's: air, water, creation of hazardous wastes**
- **Air pollution gains of late 20th century have been reversed in many places -- new manufacturing and resource extraction methods outpace regulation**
- **Unprecedented rise of "fishery piracy"**

The health and vibrancy of the natural environment is being steadily degraded over time in this world, despite the efforts of EPA and other agencies to control it. Part of the reason stems from the "Second Wave" nature of much economic activity in the country; while manufacturing and other industries are not nearly as thoughtless and rapacious as they were in the early 20th century, they still look out for number one far more than they do for Mother Earth. People try to do the right thing by the environment, but they too will always put their family's comfort as the highest priority.

The environmental threats historically addressed by the EPA are still the Agency's primary focus; incremental progress is always being made to clean the air and water, but there's always a new pollutant coming down the pike. In some cases, progress made in the 20th century has been reversed. The cumulative effect of resource depletion and carbon emissions from major industrial concerns is also more and more apparent. Its not a crisis or an apocalyptic situation, but neither is it a very pretty picture.

Scenario #2

Environment and Related Issues

- **Water safety regulations largely observed, but effects of periodic major violations / accidents are devastating and far-reaching**
- **Food safety improvements are a signal success due to renewed importance of agriculture in U.S. economy**
- **Slow pace of tech innovation has slowed substitution of new substances for PBT chemicals**
- **Major gains in contaminated waste site cleanup since privatization of Superfund program under Job Creation Act of 2007**
- **Protectionism in international economy has led to breakdown of international environmental cooperation**
- **Reductions in government-funded Research and Development (R&D) have gutted EPA scientific efforts to address existing and emerging problems**
- **Penalties for environmental law non-compliance have been made severe -- EPA has de facto constabulary authority**

Some of the specific environmental issues and challenges of this world are outlined on the slide. The mix of issues is intended to suggest that, regardless of the nature and characteristics of the world, there will be "good news" and "bad news" developments and issues alongside each other.

Scenario #2

Work-Related Issues (General)

- **"Craftsmanship" is more well developed and more highly valued than "knowledge work"**
- **Scientists and engineers are in demand by major manufacturing and resource extraction industry leaders, but jobs are few**
- **Most important competencies across industries are goal focus, persistence, responsiveness, use of "tools," customer service**
- **Basic benefit and compensation packages are relatively generous under ground rules regulated by government**
- **Greater appreciation for work environment and quality of work life, despite ability for individuals to influence this**
- **Workplace social bonds encourage job stability but tough times fuel frequent mobility of workers for new opportunities**
- **Aging of the workforce is of little concern to employers with so many young people hungry for jobs**
- **Supply and demand for labor is dictated by big companies and by government efforts to promote jobs in depressed areas**
- **All who can manage to find a job hold more than one**

Given the focus of the WAP on workforce competency requirements and issues, each scenario describes some features of the world with regard to these issues.

Due in part to the nature of education in the country, and in part to the industrial focus of the economy, hands-on skills are at least as valued in the workforce as are intellectual acumen and creativity. Because incremental advance is more a focus than innovation, the demand for top-notch scientists and engineers is relatively low.

The key competencies in this world, cutting across most industries and jobs, are noted on the slide.

People value their jobs and colleagues from a social-bond standpoint, but they understand that the exigencies of the economy make deep connections in this arena something of a luxury. If a better opportunity comes along, they know they'd be foolish not to take advantage of it. There's a combination of resentment and resignation surrounding this reality of the world. When they can secure them, people often will work part-time jobs in addition to their regular jobs; this intense competition among workers for a limited pie is one part of why the aging of the workforce is largely a non-issue, at least from the employer's standpoint.

Scenario #2

Work-Related Issues (Government)

- **Government's greatest need is for bean-counters, watchdogs, and referees**
- **Proliferation of agencies, departments, and ad-hoc task forces places a premium on communication and coordination skills**
- **Percentage of scientists and technical experts in government service is the lowest it's been since end of World War II**
- **Lawyers and legal expertise is in high demand to interpret complex webs of regulations**
- **Alternative dispute resolution skills are valued to take some pressure from over-worked regulators**
- **Information Technology (IT) expertise is key, but novel / creative application of IT is a detriment to success**
- **Understanding commercial / business perspectives is critical to effective regulation of the dominant industries**
- **Attraction and retention is easy in this tough job market -- attracting the best and eliminating the non-productive is hard**

In a highly bureaucratized environment, the government's greatest workforce need is for people who can follow procedures, keep track of things, and make sure that the enormous regulated population (i.e., everyone) is doing what they are required to do without cutting corners. Given the decreased government role in R&D, there is a diminished need for scientific and technical experts, which is fine because it makes room for the burgeoning government lawyer population. Sophisticated understanding of how to use information technology or of innovative business frameworks is of no great value in the government workforce, as such knowledge leads people to think about and advocate non-standard ways of doing things for which there is little room or tolerance.

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Alternate Future Scenario #3

Transactional Ethics are low

Practical Acumen is leading

Ecosystem Consequences are moderate

Scenario #3

Domestic Politics

- **Government is minimally interventionist at all levels -- citizens are assumed to, and prefer to, self-regulate**
- **Size of government is small at Federal level, and even smaller at state / local levels**
- **Relationships between Federal agencies and lower levels of government are just "FYI," not directive or mutually supportive**
- **Most important / valued Federal agency is the Department of Commerce**
- **People see government as a block to progress and freedom**
- **Most stringent laws are around privacy**
- **Congress essentially talks to itself -- not an awful lot to keep it occupied or focused**
- **"Activism" as once known is a thing of the past – people just do what they want anyway**
- **Individuals are heavily taxed in form of licenses for any behavior within reason**

The key feature characterizing this world is individualism almost to the point of atomization. People take care of themselves and won't have it any other way. The conduct and structure of domestic politics is one reflection of this reality. The government has become quite small and its roles and responsibilities have steadily diminished over time. Most of the familiar agencies and entities of the 20th century remain, but the people who populate them don't have much to do, though they keep each other informed about whatever it is they are doing.

Commerce is the name of the game in this world -- fast-paced, no-holds-barred, entrepreneurial commerce. The most important role of government is to facilitate this, which they do primarily by ensuring an absence of regulations and other inhibiting forces. The other primary role of government is to ensure through legal and other means that nobody is able to get too far into anybody else's business.

Scenario #3

International Politics, Economics

- **International affairs are less like "politics" of old, more like "correspondence" among businesses**
- **Key international issues: management of knowledge traffic; "irrelevance" of sovereignty; dearth of rules**
- **Militaries in industrial nations have unprecedented capability despite little spur for use**
- **U.S. economy is booming, fueled by rugged individualism and strong science / technology**
- **Key industry sectors: knowledge brokerage, novel high-tech products, space, biotechnology**
- **The nature of economic competition, U.S. and globally, is fierce, fun, and individualistic**
- **Competition for knowledge workers is pointless -- they're abundant and mercenary, prefer multiple part-time jobs**
- **The gap between "have" and "have nots" is widening quickly but all are becoming ever better off**

International affairs are vibrant and, while perhaps not "peaceful" given the intense competition of the global marketplace, always civil and focused on ensuring a level playing field. National governments are not the only, and in some ways not even the most important, players in international affairs -- businesses, non-governmental organizations, and others play key roles.

The U.S. economy is rocketing forward and upward, driven by the intense entrepreneurial spirit that is fueled by people's individualism. The greatest contributing forces to U.S. growth are high-tech products in fields like biotechnology, artificial intelligence, robotics, computers, etc; the increasing emergence of "fusion products" which combine innovations from multiple technology fields for previously unimagined applications and uses; and "knowledge brokerage" (i.e., facilitating development of new products and services by connecting innovators with one another). The "worker" is in charge of the economy for the first time in history -- companies find the greatest competitive edge comes not from hiring "employees," but rather from attracting creative and entrepreneurial geniuses for temporary "alliances" that lead to novel products that turn industries on their heads.

Scenario #3

Social Environment, Demographics

- **Education is intensive and goal-oriented -- science and analytic methods begin in kindergarten**
- **There is no real societal "glue" in this highly individualistic world -- everyone's foremost loyalty is to themselves**
- **Family structures: small, atomized, highly / frequently changing**
- **Social services are minimal -- people take care of themselves, government provides for elderly because no one else will**
- **The notion of "diversity" is meaningless -- countless ways people identify themselves as unique; minorities of one**
- **Media (e.g., print, TV) is highly customized and filtered**
- **Preferred vacation activities involve disconnecting from society -- mountain climbing, hiking, sailing, and other solo activities**
- **Near-zero population growth – people do not connect very easily**
- **Overall aging of the population as birth rates decline**
- **Little population mobility -- everyone has and keeps their place**
- **City-states emerging as urban spokes spread out**

There is really no "glue" that holds the American society together, with the possible exception of the widespread common interest in being left alone to do one's own thing. Families tend to be small and they tend to be rather fragile in nature; more and more, people put their individual work and play ahead of a stable, lasting family.

The education level of the population is higher than its ever been, with a huge number and diversity of degrees being granted and a huge number of people pursuing lifelong education in a variety of formal and informal venues. The substance of education tends to be very high-tech and business-focused beginning at a very young age. While the society is quite diverse, people don't really think in terms of diversity; they think more of themselves than the milieu around them.

In terms of demographics, population growth is essentially flat, a reflection of people's focus on themselves more than on connections with others. One result of this is an overall aging of the population, although even the very old remain quite active thanks to biomedical advances. For the first time in the U.S., "city-states" are beginning to emerge, reflecting the desire of many to have some connection with others while still emphasizing autonomy and self-interest.

Scenario #3

Technology Environment

- **Technology development is extremely advanced and moves at a blinding pace**
- **American innovators define the edge of the envelope in Research and Development (R&D) and novel technological applications**
- **Information Technology (IT) has evolved to genuine Knowledge Technology, and everyone is a "KT geek"**
- **There is no such thing as technology standards, making compatibility of systems difficult and sometimes debilitating**
- **Environmental technology, as such, is not a major focus -- it is embedded in most other technology as a complementary aim**
- **Transportation technology sector has been revolutionized by individualization (e.g., modular personal transport devices)**
- **Commercial space is a booming field -- 75% growth annually**
- **Biotech applications dominate in healthcare, materials, energy**
- **Robotics and automation pervades in the home and workplace**

Technology is advancing at a nearly blinding pace throughout the world, but the U.S. is noticeably the fastest horse among all the fast horses. The development of technology reflects the trends described throughout this scenario -- it is driven by maverick intellects and individuals with no shortage of money to risk and no shortage of tolerance for risk-taking.

The ever-deeper fusion of information technology (e.g., computers, databases) with communications tech, biotech, and an enhanced understanding of how the human mind works has led over time to genuine Knowledge Technology. Another signal feature of the technology arena is how environmental thinking is embedded in most R&D ventures and the resulting products and applications. This is due not to any engrained environmental sensitivity in the developers, but rather to an understanding that the market will reward them for creating things that serve multiple ends simultaneously. There's almost a fascination on the part of tech-savvy consumers with products that allow them to do unprecedented things and still not harm the surrounding environment.

Development of some specific key technology / industry sectors is outlined on the slide.

Scenario #3

Environment and Related Issues

- **The general state of the environment is very healthy despite people's individual carelessness about protecting it**
  - **The earth's capacity for self-healing is better understood**
  - **Environmental sensitivity is embedded in entrepreneurialism**
- **Federal regulatory role has essentially vanished**
- **EPA is an experimentation paradise for environmental scientists**
- **Science is discovering new ways to renew "finite" natural resources by artificial / technological means**
- **The popular attitude toward the environment is, "don't worry -- we can always engineer a better one"**
- **Key environmental issues / challenges are new ones :**
  - **e.g., radiological**
  - **e.g., human health effects of electrical frequencies, magnetism**
  - **e.g., impact on natural environment of engineered flora and fauna**
- **Primary air pollution concern is uncertainty / volatility of new biochemical substance emissions reacting with each other**

The relationship of people to the environment in this world is almost paradoxical. People don't think much about the environment in the sense that people did in the 20th century. They are not particularly mindful of how the things they do might impact their surroundings. And yet, the state of the environment is excellent despite such relative carelessness. It can be attributed in part to our improved understanding of how the earth is able to heal itself, and in part to our unprecedented ability to intervene and *engineer* the environment (if there's a profit to be made doing so). Our ability to manipulate the earth, genetics, etc helps to mitigate, and sometimes even reverse, environmental damage.

Given the individualistic nature of the society, and people's tendency to watch out for and take responsibility for their own behavior, there is relatively little Federal (or even state and local) regulatory role as regards the environment. The EPA workforce that remains is keeping a watchful eye over people's technology-based interventions in the environment (e.g., creating new species through biogenetics; creating new wetlands where there were none), but there is little they can do to guide or control these activities. At this point, they've just got their fingers crossed.

While the kinds of environmental threats historically addressed by the EPA have not been eliminated, major progress has been made, and people see these challenges as almost mundane at this point. Our increased understanding of the ecosystem (broadly defined) and how humanity interacts with it has led to a greater focus on issues not previously seen as environmental issues (e.g., human / electrical frequency interaction.)

Scenario #3

Environment and Related Issues

- **Wetlands losses of late 20th century have actually turned to net gains in recent years**
- **Surface and groundwater safety has increased via new urban planning and agricultural management practices**
- **Food safety remains a concern due to rapid proliferation of new pesticides and new biotech foodstuffs**
- **Biotech industry has made major contributions to reducing waste buildups (e.g., microbial breakdown of contaminants)**
- **Manufacturers race each other to implement new environ-mental management innovations to gain a competitive edge**
- **Brownfields redevelopment is an entrepreneurial growth area**
- **Global environmental threats (e.g., ozone depletion) have not been addressed -- international relations are too detached**
- **Former EPA role as disseminator of environmental information has been usurped by commercial entities**

Some of the specific environmental issues and challenges of this world are outlined on the slide. The mix of issues is intended to suggest that, regardless of the nature and characteristics of the world, there will be "good news" and "bad news" developments and issues alongside each other.

Scenario #3

Work-Related Issues (General)

- **Work is indistinguishable from play and/or education -- all are seen as forms of self-improvement**
- **The fastest growing employment field is "knowledge brokerage"**
- **Most important competencies across industries are creativity, inventiveness, decisiveness, "KT" skills, grasp of complexity**
- **Supply and demand of labor is entirely in the control of the individual – free agency dominates**
- **Numerous part-time, short-term, by-contract "jobs" are the norm -- "career paths" as once known are effectively gone**
- **Latter-day "guilds" emerge as temporary communities focused on entrepreneurial opportunities**
- **Aging of the workforce not an issue -- knowledge workers are active well past "retirement age"**
- **Compensation and benefit packages are carefully negotiated and highly customized to the individual**
- **Lifelong education is an absolute requirement for success**

Given the focus of the WAP on workforce competency requirements and issues, each scenario describes some features of the world with regard to these issues.

Work, play, and education meld into one another for most people in this world. This is in part because the knowledge and learning component of work is so great, and partly because people's competitive and entrepreneurial spirit are so deep that their business becomes indistinguishable from their pleasure. As noted on slide 168, knowledge brokerage (i.e., facilitating development of new products and services by connecting innovators with one another) is a booming field with endless possibilities.

The key competencies in this world, cutting across most industries and jobs, are noted on the slide.

People increasingly are what was called "self-employed" in the 20th century. What this means today is that they work multiple short-term and simultaneous endeavors, sometimes in service to other people's companies and sometimes for their own direct profit. Increasingly, innovators and creative geniuses and marketing specialists are joining together in "guilds" of sorts to facilitate the development of and trade in new products. Benefits and compensation are, like most aspects of work, almost entirely in the hands of the individual -- the marketplace for labor is comprised of 280 million self-regulating autonomous economic units who carry their own benefits with them from job to job rather than depend on an employer for health care, and other job-related benefits.

Scenario #3

Work-Related Issues (Government)

- **Government's greatest need is for accountants, systems integrators, and knowledge brokers**
- **People skills and cultural sensitivity are key, as government must connect with so many individualistic constituents**
- **Understanding of commercial business frameworks is key in all agencies and at all levels within agencies**
- **Science / technology experts remain in government to monitor businesses despite minimal controls on commercial sector**
- **Attraction and retention is largely redefined -- people serve limited-contract stints then move to the next opportunity**
- **Constant employee in- and out-flow makes it hard to develop organizational cultures and pass on institutional knowledge**
- **Conversely, constant in-flow of new ideas is a boon**
- **Government has more money to spend on substantive initiatives since less is spent on employee benefits**

While government's responsibilities are minimalist in this scenario, the world over which governments preside is complex and fast-moving, and government employees and managers must be highly skilled at understanding how all the myriad parts and actions fit together. In the interest of fostering U.S. economic competitiveness, there is some government knowledge brokering activity, a role which even highly independent entrepreneurs welcome and find useful.

Because individualism is so great, government workers must also be very good at connecting with people on a highly personalized level, placing a premium on people skills. Scientific and other technical experts increasingly are questioning their place in government, as they have little opportunity to directly influence or work with their civilian counterparts.

The biggest challenge for government in terms of its workforce is the cultural adjustment to not really having a workforce as they once defined it. With relatively few permanent employees and a constant flow of experts in and out of agencies to work on specific initiatives, the very idea of "attraction" and "retention" is changed -- getting people to work for the government on discrete projects is easy so long as the projects are interesting, but it is increasingly rare for people to think about continuing their government service beyond the expiration of an individual project.

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Alternate Future Scenario #4

Transactional Ethics are high

Practical Acumen is leading

Ecosystem Consequences are moderate

Scenario #4

Domestic Politics

- **Government is extensively networked, and highly cooperative**
- **Citizens demand and receive a careful, reasoned consensus process encompassing many decision participants**
- **Doing business based on consensus results in inefficiency, but citizens are patient with this due to high value placed on consensus**
- **Overall size of government is large to ensure ever more checking and balancing**
- **Most important / valued Federal agency is the Department of Legal & Social Justice, formerly the Department of Justice (DOJ)**
- **Most stringent laws are around fairness**
- **Congress has more power and authority than other branches**
- **Most transactions and activities are taxed by some entity, to discourage extremity in behavior**
- **Activism valued for political and social reasons, but is more like "preaching to the choir" than "debate"**

The key feature characterizing this world is an overall sense of balance, reasonableness, cooperation, and consensus. This is reflected in domestic politics as well as in most other aspects of life. The deliberative mechanisms of government are well-developed and extensive, and there is ample room for individual citizens to be involved. Checks and balances are at the forefront of everyone's minds, not out of distrust, but simply because it seems like the right, balanced thing to do. While it is frequently an inefficient system, people like it this way.

Social justice and fairness are of deep importance to the everyday citizen and thus are deeply important to the members of government as well. Because it represents the people in the most direct and personal manner, Congress is the most highly valued branch of government and the one with the greatest influence on the policies and direction of the country.

Scenario #4

International Politics, Economics

- International affairs are calm and cooperative
- Political relationships among nations are characterized by webs of evolving "deep coalitions"
- Key international issues: global management of fairness; process and cost of helping the disadvantaged; integration of global economic structures and industries
- Militaries in industrial nations are seen as a necessary evil, and thus are under-funded
- U.S. economy is growing steadily and is well integrated, internally and internationally
- Key industry sectors: services, solutions, energy, culture
- Economic competition within the U.S. is kind and gentle, regulated more through social pressures than laws
- Competition for "knowledge workers" is intense, but reasoned & fair to protect economic integration and national cooperative spirit
- Gap between "have" and "have nots" has been largely wiped away by cooperative spirit

The cooperative and deliberative dynamic seen in U.S. domestic politics is mirrored in the larger world. The conduct of international affairs is characterized by the operation of what the Toffler's have called "deep coalitions" -- multi-layered associations of nation-states and non-state actors that assemble themselves in order to move collectively toward a common goal. These "deep coalitions" are generally temporary; nations and other actors tend to combine and recombine in numerous, differently configured ways as issues arise that are of importance to different sets of interests (e.g., allies, different agencies within a national government, trans-national issue groups and/or non-governmental organizations (NGO), business persons).

The U.S. economy is growing in a vibrant but at the same time very steady and stable manner. It is deeply inter-linked with the economies of other nations and is well integrated domestically across industries, and other economic entities. It is a largely service-driven economy. Enterprise solutions (e.g., tailored applications of software and hardware) and the export of culture (e.g., entertainment) are two particularly prominent areas of economic activity. The economic competition in the U.S. is strong and goal-focused, but, like other aspects of life, it is characterized by fairness and care for the common benefit.

Scenario #4

Social Environment, Demographics

- **Education is holistic, infused with both the spiritual and the technical**
- **The primary "glue" of U.S. society is our common purpose of ensuring each other's reasonableness**
- **Extended and non-traditional family structures predominate -- they are often global in nature**
- **Social services are cradle-to-grave but inefficiently administered -- big focus on "feel-good" services (e.g., counseling)**
- **Diversity is strongly embraced, acknowledged, and celebrated -- people see the whole human race as one great rainbow**
- **Media is not very analytical -- all views broadcast and equally valued**
- **The preferred vacation activity is extreme sports and adventure travel to rugged destinations**
- **Population is declining as people see Earth cannot sustain large growth**
- **Significant population mobility -- people can and do maintain their treasured social webs no matter where they move to**
- **Urban growth has been moderate as population migrates back and forth from city to rural areas**

The nation has perhaps never been as unified on the social-cultural plane as it is in this world. Broadly speaking, everyone is mindful of everyone's welfare -- although on some level this also means that everyone is keeping an eye on everyone else.

The national predilection in education reflects the spirit of consensus and holism seen elsewhere (e.g., people generally are steeped in a broad but very thoughtfully chosen and commonly-agreed mix of the hard and soft sciences, the technical and the spiritual). Families are rather broadly defined -- blood relations and deep friends often merge into what once might have been called "clans," and these extend around the world rather than disintegrate if people move overseas. Those who do move away, even permanently, still profoundly view themselves as Americans, and they treasure their bonds as we all do with all Americans of every color and background. Interestingly, because of the heavy emphasis placed on reasonableness in every aspect of life, people, when they vacation, tend to prefer "unreasonable" things like extreme sports just to spice things up a little.

The population has been declining for some years, not dramatically but steadily, as people acknowledge that too many people making demands on the natural environment is unwise. People move around a lot, around the country and around the world, in search of new opportunities and relationships.

Scenario #4

Technology Environment

- **Technology development in U.S. is proceeding rapidly but carefully / thoughtfully**
- **Strong emphasis on holistic pursuits and attention to impacts of new technology developments**
- **Information Technology (IT) is very user friendly, based on global standards, and transparent (i.e., embedded everywhere)**
- **Government funding of basic Research and Development (R&D) is significant**
- **Environmental technology development is subsidized by multiple government agencies in collaboration**
- **Seamless transportation architecture connects everyone and every place easily**
- **Space is being aggressively but sustainably developed -- seen as a global social unifier**
- **New energy sources / applications are being pursued strongly**
- **New technologies for sustainable exploitation of natural resources are being pursued strongly**

Technology development in the U.S. can be characterized as highly advanced but scrupulously sustainable. The economy supports and is fueled by high tech ferment, but those in R&D and entrepreneurial areas are very mindful not to go down paths until the impacts and implications have been thoughtfully explored. Another emphasis in technology development is to pursue avenues that will link well with existing technologies and things known to be in the pipeline.

The government spends a significant portion of its annual budget sponsoring or directly conducting R&D, and people generally welcome this high-level guidance and direction. A particularly strong focus of both government and commercial R&D is technology designed to clean up and/or preserve and protect the environment.

Information technology is ubiquitous in this world; nearly everything around us has a chip in it, and/or some kind of two-way communicative capability. Development of some other specific, key technology / industry sectors is outlined on the slide.

Scenario #4

Environment and Related Issues

- **The state and health of the natural environment is pristine because everyone is monitoring everyone else**
- **EPA is a central player in a matrix of government agencies working together to preserve the environment**
- **Science, technology, and human creativity are seen as equally key components of environmental protection**
- **Natural resources are valiantly protected by U.S. and foreign government and citizens as a joint global responsibility**
- **The popular attitude toward the environment is reverent -- "we must cherish our legacy"**
- **Key environmental challenges / threats**
  - **Nothing chronic**
  - **Forest management**
  - **Waste disposal**
  - **Impact of chemicals**

Here even more so than in the previous scenario, the environment is in extremely good health and well preserved. People are quite conscious of the environment and of how they -- and the others around them -- can either help it or harm it through their actions.

There are a host of Federal and lower-level government agencies that all have roles and missions in the area of environmental responsibility, and EPA is at the nexus of this goal-oriented collection of actors. Businesses and private citizens collaborate with the government players to add their unique capabilities to the environmental protection effort. This cooperative structure and spirit is reflected in the U.S. and on the international plane. People place value not only on the science and technology component of environmental protection, but also on the imaginative and creative "soft science" component.

It is not that this world reflects an environmental nirvana free of any problems or threats, but the problems that do exist are not chronic, and there is a general sense that we will get them taken care of without any truly detrimental outcomes.

Scenario #4

Environment and Related Issues

- **Major gains in recent years on addressing impact of air pollution on other media, especially water**
- **Strong national consensus among all stakeholders on water quality standards and criteria**
- **Waste buildup problem emerging -- inaction due to continual debate on environmental impact of various disposal methods**
- **Food safety is diminished by insects and other organisms since total pesticide ban was enacted**
- **International cooperation on environmental issues is led by the U.S., is at an all-time high, and is very effective**
- **Pollution prevention efforts have been a signal success in this proactive / holistic minded world**
- **EPA's user-friendly environmental information website is consistently in the top 10 for "most hits" nationally**
- **Need for regulation is dramatically reduced since everyone is so mindful of their own and each other's actions**

Some of the specific environmental issues and challenges of this world are outlined on the slide. The mix of issues is intended to suggest that, regardless of the nature and characteristics of the world, there will be "good news" and "bad news" developments and issues alongside each other.

Scenario #4

Work-Related Issues (General)

- **Work is a primary social environment as well as a means of making a living**
- **Employers and employees value and pursue consensus on what to do and how to do it**
- **Fastest growing career fields are provision of new services, integrated technology solutions, and diplomatic service**
- **Most important competencies across industries are loyalty, consensus-building, seeing connections, focusing on quality, and "perfectionism"**
- **The supply and demand for labor is essentially static – individual job descriptions expand, rather than career fields**
- **Benefits and compensation packages are constantly changing as new best practices are emulated by others**
- **Longevity in jobs is the norm**
- **Working overtime is seen as reasonable and fun**

Given the focus of the WAP on workforce competency requirements and issues, each scenario describes some features of the world with regard to these issues.

People generally love to work in this world, in part because they view it as another opportunity to interact and work cooperatively and form bonds with others. Value is placed on consensus in the workplace as everywhere else; like in government, this sometimes comes at the expense of efficiency.

The key competencies in this world, cutting across most industries and jobs, are noted on the slide.

There is not a great deal of activity in the labor marketplace. People tend to like to stay in their jobs, getting better and better at what they do and forming deeper bonds with their colleagues that serve both social and professional ends. Rather than new career paths opening up in a given industry or service sector, people's individual job descriptions open up and incorporate more new responsibilities. This is welcomed by both employer and employee alike.

Scenario #4

Work-Related Issues (Government)

- **Government's greatest need is for managers, negotiators and consensus-builders, and communicators**
- **Emphasis on checks-and-balances means government employees must have deep knowledge of :**
  - **All other Federal agencies and their responsibilities**
  - **Numerous state and local entities and their responsibilities**
- **Government is seen as an attractive workplace for scientific and technical experts**
- **Attraction and retention is easy due to national predilection for job loyalty and longevity**
- **Non-productive workers is rarely an issue -- commitment and enthusiasm of government employees is generally high**
- **Experience with commercial / business perspectives is useful but not critical, as "civilians" collaborate deeply with government**
- **Information Technology (IT) skills are highly valued**

The nature of the consensus process in government places a premium on skills and competencies (e.g., communication, management and coordination, team work, adaptability, planning, cross-functional understanding). Because so many agencies and departments work with one another in so many capacities and issue areas, it is important for employees in each agency to be well versed in the roles, missions, specific initiatives, and sometime even the skill sets of employees in many other agencies.

Because of the focus in government on R&D in the service of the environment and other social welfare requirements, scientific and technical experts are in high demand, and they find the government an intellectually challenging and generally fulfilling place to work. In general, commitment and enthusiasm over the long haul is the norm in government employees, as it is in most other segments of the national workforce. There is not a particularly great premium placed on government employees understanding the "civilian / commercial mindset," because the private sector collaborates so closely with the public sector in many areas.

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Impact & Implications for EPA

Scenario #1

Impact and Implications for EPA

- **In a highly fragmented world of micro-communities, there may be little popular desire for big-picture agencies like EPA**
- **Most effective role for EPA could providing funding to the plethora of micro-local entities**
- **Dearth of societal cooperation suggests a need for EPA emergency response capabilities when problems erupt**
- **Positioning the agency as reactive to whatever problems may emerge makes it hard to inculcate a strategic view**
- **Main issue for EPA is if the Agency can fulfill its mission at all if the society is uninterested in causality and the big picture**
- **EPA can make environmental information available, but needs to identify ways to get people to pay attention to it**
- **Diminished desire of people to serve in Federal jobs could make it exceedingly difficult to populate the EPA**
- **Fragmented nature of the world suggests a need for numerous local offices instead of a handful of regional offices**

One of the primary issues for EPA in a world such as this one has to do with the simple fact that few may wish to have a national-level entity around to tell them what to do and what not to do. A counter to this could be the desire that even highly autonomous communities might have for funding to administer their local programs and preferences.

In such a fragmented world, problems may not be apparent and may arise unexpectedly because no one is really watching for them. This suggests a potentially more important role for EPA to respond quickly and decisively when problems erupt and when the involved communities are unable to work together to address them. The flip side of this might be that a need to focus so much attention and human and other resources on reacting could make it difficult to focus sufficient attention on proactive or long-view issues and solutions.

Some other challenges EPA would have to consider in a world like this would include: how to tailor its information about the environment so that local communities value it and pay attention to it; how to fill its workforce ranks given people's predilections not to devote their lives to Federal service (the size of the agency in a world like this is an interesting question); and how to redefine the organizational structure so that it is optimally responsive to local needs (i.e., regional offices may have little relevance in a world where "regions" have little relevance).

Scenario #2

Impact and Implications for EPA

- **This world suggests an renewed importance of command-and-control methods, which EPA is currently moving from today**
- **Increased policing role represents an expansion of current EPA responsibilities**
- **Experts in responsibilities outlined here increasingly are retiring from EPA -- issue around how to hand down their skills**
- **Relatively minor role for science and technology expertise currently predominant in EPA workforce**
- **Finding a way to develop alternative dispute resolution skills to take the pressure off the lawyers and regulators**
- **Bureaucracy inhibits agility and effectiveness -- find a way to enhance this trait given constraints of traditional government structures**
- **The EPA in this world could require well more than 18,000 employees to fulfill its mission**

In some ways, this world is very like the world in which the current EPA workforce grew up professionally -- it is a somewhat extreme extrapolation of today's world into the future, but many of the fundamentals are similar. The current EPA workforce is deeply experienced in and extremely good at "command-and-control" ways of doing business. The current EPA leadership, responding to changes they perceive in the real world of today, are focusing more attention on different kinds of skills and approaches, but if these currently perceived trends never become dominant, will the leadership have let wither a skill set that might continue to be the most appropriate for the mission?

The scenario posits an increased "constabulary" role for the EPA -- i.e., the kinds of responsibilities more in the purview of lower levels of government today. The kinds of skills present at these lower levels could be important at the Federal level in a world such as this one.

Building on the first point, if command-and-control type competencies leave the EPA workforce, especially given the percentage of senior employees eligible for retirement in the coming 5 years, is there a way that these competencies can be passed down to a new generation that could perhaps have need of them?

Some other challenges EPA would have to consider in a world like this would include: a potential mismatch between today's large number of science and engineering staff and the need for such expertise; the challenge of being effective in a bureaucracy even more Byzantine than today's Federal government; and the potential need for more employees in an era of government downsizing.

Scenario #3

Impact and Implications for EPA

- **The environment's in great shape. People regulate themselves. The world wins. Individuals must identify what is left for them to do**
- **An atomized world with lots of independent, unregulated economic activity requires supreme integrative understanding**
- **Monitoring competencies may still be important -- everything's fine right now, but what dynamism might spawn is not known**
  - **EPA as early warning system rather than reactive responder**
- **Relying on outsourcing for as-needed technical and creative experts represents a huge culture change**
- **Maintenance and passing down of institutional knowledge would be a major challenge and potential impediment to effectiveness**
- **Deep knowledge and expertise needed in biology and biogenetics**
- **If circa-2000 problems are largely solved and effectively take care of themselves, opportunity opens up to think strategically**
  - **Be proactive on technology and new problems that might emerge**
  - **Focus on social, other non-technical impacts on the environment**

The starkest question arising from this world is, what is the need for an EPA at all? As with all the scenarios, the picture painted here is purposefully extreme, to stimulate thinking, and thus this question is extreme as well, but the idea at the heart of it is useful to consider. In a world where the objectives for which the EPA was created are being increasingly well met, there will likely still be an EPA, but how fundamentally might its mission and specific roles and responsibilities be transformed?

One potentially important role suggested is that of early warning system when things appear to be starting to go awry. In a world of increasingly autonomous actors, regulation may be less useful, but the EPA could potentially be quite effective if positions itself as a scrupulously objective and dispassionate observer of the environment, sounding an alarm as needed and spurring the creative and high-tech capabilities of the civilian world to respond in the most efficient and effective manner.

A great deal of work for all government agencies is done by contractors today, but the world depicted here takes the idea of outsourcing and reliance on as-needed, tailored, temporary help to a fundamentally different level, and suggests an enormous cultural transformation -- particularly for an agency where historically so many employees remain for their entire careers. One down side, notionally, would be the difficulty of maintaining an institutional memory -- perhaps "institutional memory" would need to become a job category in the small remaining permanent workforce. Alternatively, in an extremely dynamic world, with problems and challenges changing constantly, institutional knowledge may become less useful more quickly, making this less of an issue.

A potential bright side of a world such as this is the opportunity it would present for EPA to focus on emerging new issues, on the deeper underlying causes of problems, on the long-view strategic challenges and opportunities. If and when the well-known today-problems and near-term-problems are brought under control and/or are genuinely being addressed by the private sector, the EPA could position itself at the cutting edge of environmental and even broader social welfare research and public service.

Scenario #4

Impact and Implications for EPA

- **Competencies currently being developed around environmental justice are deeply valuable in this world**
- **Opportunity to guide national tech development suggests a need for more technical specialists from broad range of disciplines**
- **Soft science, creative, spiritual mindsets needed in the workforce alongside technical to achieve the holism people demand**
- **Popular attitude toward environment is EPA's dream -- it should be creatively and aggressively nurtured, not taken for granted**
- **Consensus gets in the way of decisiveness -- there a risk of inaction on problems that do emerge**
- **This world suggests a decreased need for lawyers and regulators, but EPA currently has a large population of these experts**
- **Opportunity for government-commercial partnerships could present a major cost saving for the taxpayer**
- **Key workforce competencies needed in this world do not appear well represented or developed in the current EPA**
- **The current "lifer" culture is a boon here -- can it be maintained?**

The nature and characteristics of this world seem congruent with the kind of world we believe EPA envisions today if and when they imagine "environmental justice" come to fruition. Accordingly, the kinds of collaborative, adaptive skills and competencies valued today in employees focused on environmental justice would appear to be of great utility in such a future world.

The major emphasis on "hard" science and technology fused with imagination and "soft" science suggests an increased importance in a world like this one for technical experts from a much wider range of disciplines than are reflected in the current EPA workforce. Even more important than the specific technical field qualifications of any individual would appear to be an ability to see and think and work across the boundaries of individual technical disciplines.

In one sense, this scenario represents a "dream world" for EPA, particularly from the standpoint of people's attitude with regard to the environment. In such a world, even as this popular enlightenment is justifiably celebrated by EPA, it would be important for EPA to devote a portion of its workforce -- perhaps a significant portion -- to the continual cultivation and deepening of this mindset. It suggests skills generally associated with public relations, "perception management," and the like.

A potential downside of a world so focused on consensus approaches to shared problems is the risk of not being able to respond quickly and appropriately when urgent situations arise. This risk would suggest a need for competencies like decisiveness, courage, and an ability to manipulate the political process for focused objectives.

Some other challenges EPA would have to consider in a world like this would include: facing the reality that many of the kinds of competencies seemingly important in a world like this are not currently well represented in the workforce; and maintaining an ability in an era of intense HR competition to attract good people for "lifelong" commitments to the agency.

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Themes and Issues Relating to Future Competencies and Gaps

Workforce Assessment Project Task 4

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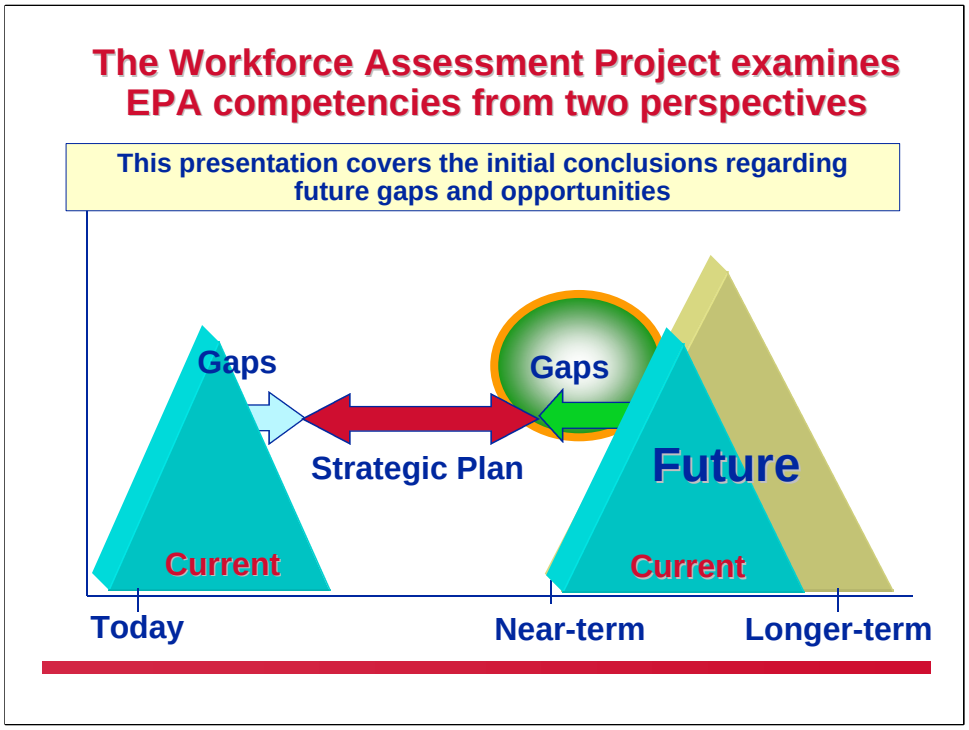


This slide represents the relationship between the current and future competencies portion of the Workforce Assessment Project.

Task 1 assessed current EPA workforce competencies and gaps and makes recommendations for improving agency competencies.

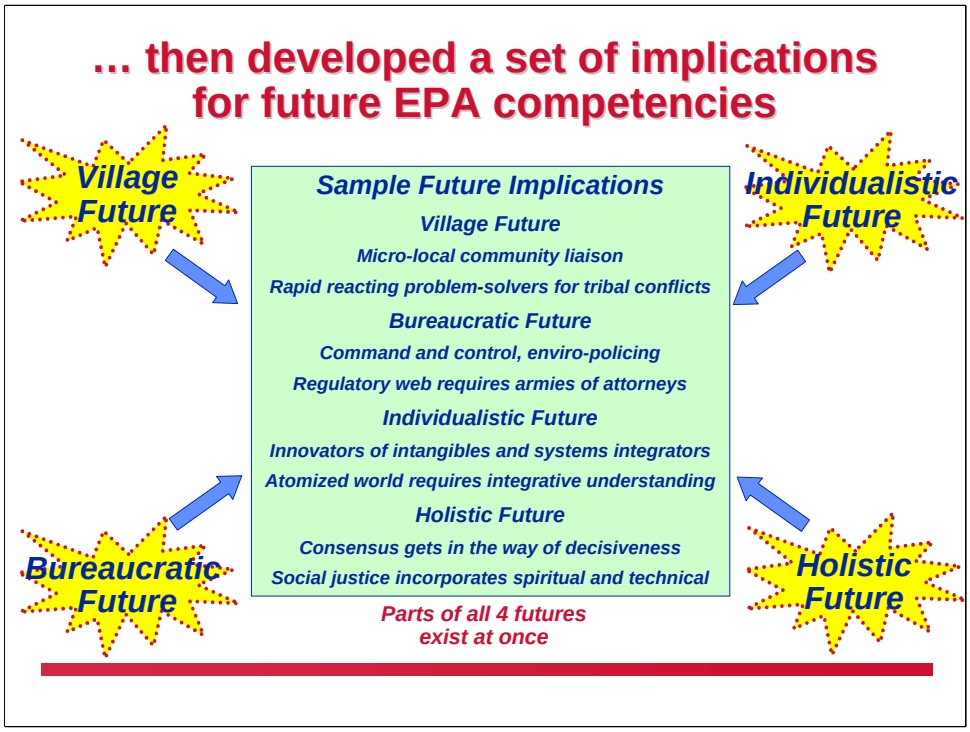
Task 2 involved articulating multi-dimensional drivers of change, taking into account a range of political, economic, technological, environmental, social-cultural, and other forces.

Task 3 involved developing a series of plausible alternate future scenarios to serve as a conceptual backdrop for thinking about the implications that might emerge from the interactions of driving forces for EPA and its workforce.

In Task 4, we focus on competency requirements for the EPA workforce of the future. We draw in this task on the insights derived from data and analysis gathered in the first three phases of the WAP, and on additional analysis by the project team plus discussions with a variety of experts outside the EPA

This slide summarizes the four alternative future scenarios developed in Tasks 2 and 3. The development of these scenarios was a creative process that used as its foundation the input gathered from approximately 300 individuals throughout the agency. The process was supplemented by considerable research into possible real-world future outcomes. The scenarios themselves are based on a framework of extreme manifestations of the identified driving forces of change. Numerous rich and detailed features are imagined for each world and woven into four separate stories. The stories reflect the ideas heard in our interviews and focus groups

The purpose of the scenarios is not to predict a future, rather, it is to envision several logical, coherent, detailed and plausible future operating environments. The scenarios recognize that the future will be a non-linear change from the present, and therefore cannot be predicted. Plausible, reasonable outlines can be anticipated, however, and strategies that play out well across several possible futures can be developed to improve decision-making abilities. In this project, they are used to improve critical workforce development strategy decisions beyond the incremental changes used in most planning efforts.

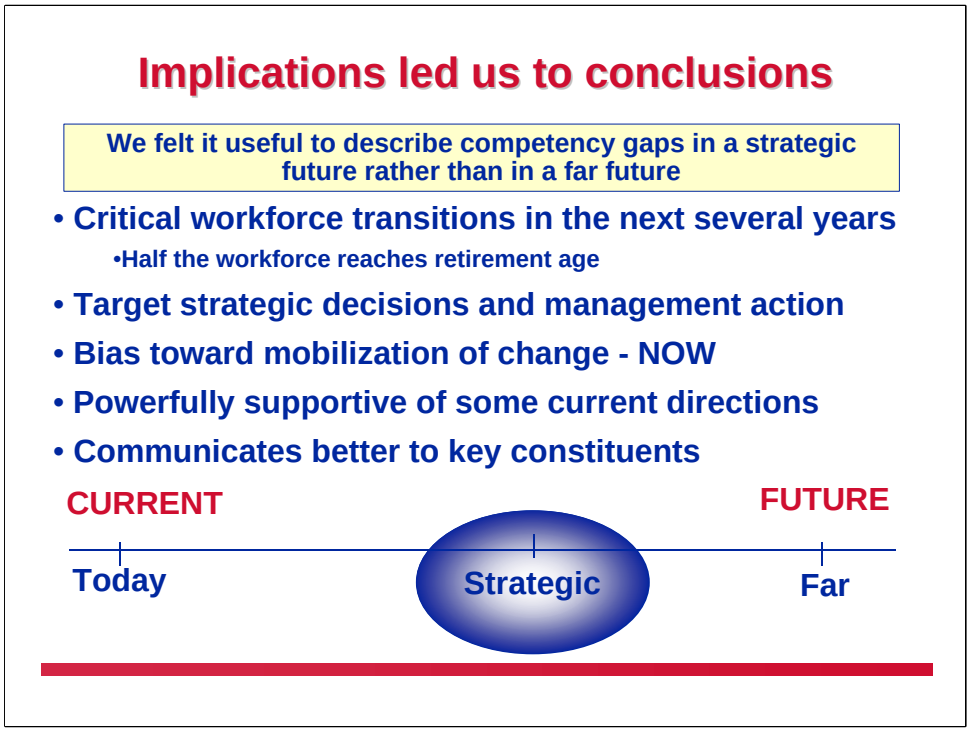


Each of the possible futures carries with it a set of implications. These futures help us understand the implications and competencies needed for a real multidimensional future.

The scenarios are purposely designed to represent the edges of the plausible planning space. Each scenario suggests clear and in some cases starkly different challenges, opportunities and issues for the EPA. The different possibilities for mission focus, the different expectations among the people in the various future worlds all imply different competencies for the agency's future workforce. Our objective here is to see what competencies are salient in a range of futures because these are the ones upon which the agency's development efforts are best directed.

Each future implies a set of competencies for the future workforce. One objective of this project is to identify those competencies seen as critical or important and cutting across a range of plausible future environments.

From there, a plan needs to be developed and progress monitored to acquire and integrate the competencies into agency strategy. To the extent that a broad and flexible base of competencies is developed throughout the workforce, adjustments to adapt to specific needs and contingencies will be feasible as the future unfolds.

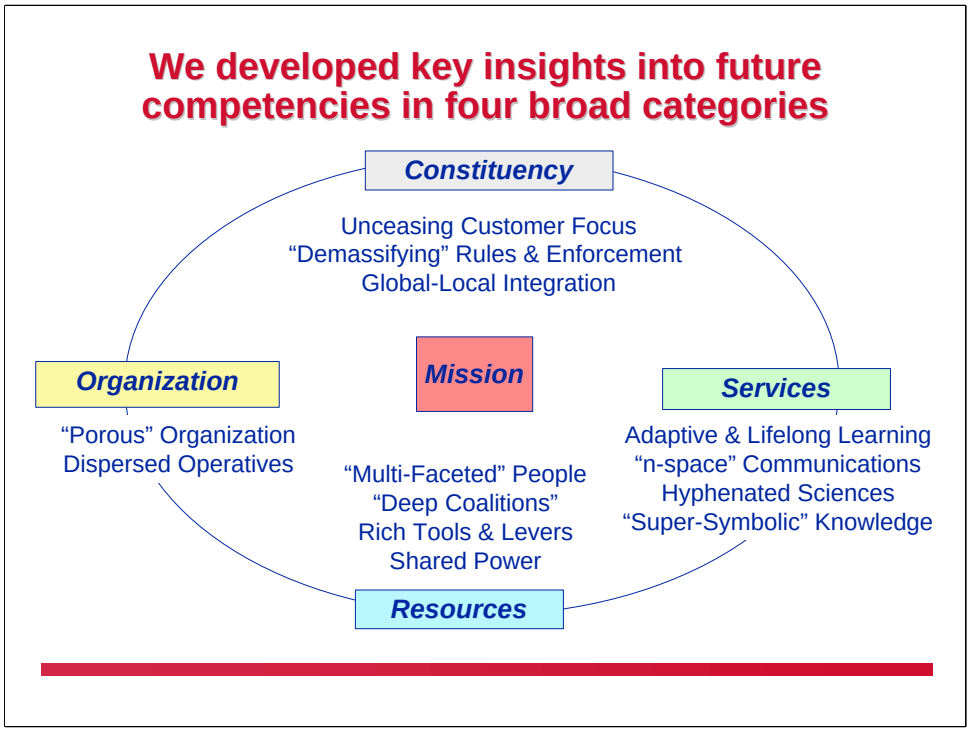


Different planning timeframes were considered within which the agency could address its staff development efforts. Traditional planning efforts are consistently too conservative because they fail to acknowledge the discontinuous events that shape our real world. Most planning efforts miss opportunities and fail to anticipate specific key challenges. To stretch thinking, it is important to consider futures that encompass revolutionary changes -- the scenarios developed for the WAP do this by design, and thereby enable us to think about the hardest possible challenges.

Having imagined these possibly radical futures, however, it is important to step back and think in terms of a more strategic future -- one that is near enough to today to encompass the *most urgent* challenges, but still out beyond most planning horizons. This is the future that can be influenced by near-term decisions and actions designed to position the agency advantageously for any emerging real-world future. The people hired today to replace the retirement wave must be flexible enough to continually expand their horizons and grow professionally.

Over the next several years, demographics suggest the agency will experience an unprecedented number of employee retirements---up to 47% of the workforce within five years. Responding to this challenge will require innovations in the ways EPA recruits, hires, and develops employees. Bringing in the right talent is one of the most critical issues facing the agency today. The expected employment changes can be used to the agency's advantage as it prepares to meet the accelerating challenges of environmental protection. New competencies and new ways of operating will be needed. At the same time, the agency needs to ensure that it retains the knowledge of its departing workforce as much as possible.

The conclusions and recommendations are designed to help EPA see past current uncertainties and make decisions about how to build a competent and productive workforce for the future. Many of the future needs expressed here are already emerging as challenges today. Nevertheless, seeing these needs in future terms prompts us to apply future-focused solutions and to hire or develop people ready for the next job.



Like the environment it protects, the future for EPA will be far different from the present. The following slides are organized into broad strategic categories and address the challenges presented by an environment of multidimensional, accelerating change.

Organization--To improve its ability to address emerging environmental issues and threats, the agency will need to develop enhanced and deepened relationships with a host of other players. They will have to establish innovative new organizational forms to take advantage of the full capabilities of their employees and other stakeholders.

Resources--The greatest resource of the EPA has been and will continue to be its people, but people must change to meet the changing world around us. Multi-dimensional environmental problems will demand multi-dimensional people, people with multiple specialties, an ability to integrate a variety of disciplines, and an ability to be flexible and adaptive. The future will require moving beyond diversity to a culture where everyone is valued for their unique contributions.

Services--Although information and knowledge have always been important factors, today they play a more central role in helping EPA fulfill its mission. Information and knowledge play an increasingly critical role in every aspect of society--and therefore demand that the agency exploit them to their fullest to provide powerful new kinds of services. This means moving beyond cleanup and regulation to using more intangible means to create entirely new ways of protecting the environment--agency knowledge and information can be its most powerful source of influence and persuasion. While knowledge and information create opportunities for environmental protection (e.g. by enabling negotiation of win-win solutions), they also multiply the challenges, so EPA must work to add value by artful development and application of its knowledge resources.

Constituency--By building a larger, more global network, EPA increases its knowledge and hence, its ability to serve its "customers." As transactions with the environment grow in number and complexity, policing individual actions becomes more difficult. A robust global network is essential for the agency to interact proactively with people at the level of their values to influence actions. Everyone must be involved because everyone and everything is increasingly interconnected.

Mission--Historically, the agency's mission has been defined by the agency itself--and has been universally supported. Nevertheless, it has been defined in the EPA's own terms, not necessarily terms that resonate with the American people. As we move forward, the agency needs to listen to the people and reflect the environmental mission that embodies the will of the people, expressed in terms they understand and support.

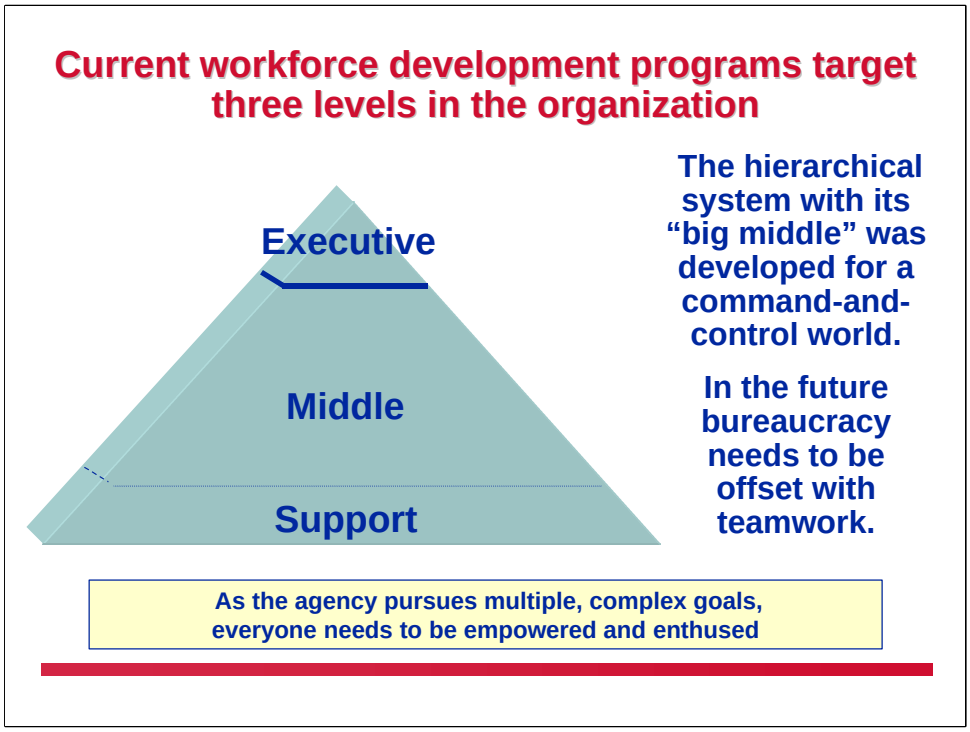
Bureaucracies are the dominant (and effective) form of organization for an industrial economy, ideally suited to delivering standardized rules, regulations, and decisions. Decisions are made at the top and action is taken at the lower levels.

Today we have evolved from a largely industrial economy and society to a knowledge-based and knowledge-enabled one. The transition is changing our culture and the way we think. To synchronize itself with the knowledge environment, the EPA needs to transform its organizational structure to enhance its maneuverability. For example, the agency needs to begin to transform its bureaucracy in order to adjust swiftly to immediate pressures, and it needs to cultivate people who are comfortable without the old boundaries or stovepipes. Given a supportive environment, knowledge grows organically, in all directions at once, and the agency needs to take full advantage of this characteristic of the knowledge environment. Ideas achieve their greatest potential when they are permitted to intermingle freely--so the people who generate those ideas must be allowed to interact and influence each other multidirectionally. A stimulating professional environment is also a wonderful recruiting and retention tool.

A key requirement is for everyone to own and take responsibility for implementation of those ideas. This competency must be cultivated throughout the workforce both by the organizational structure and by the leadership. Individuals that demonstrate the ability to work in these new ways need to be encouraged and rewarded.

It is important for EPA to develop a greater congruence with the commercial world. We must recognize where we can adopt useful organizational lessons from business, and where we cannot, recognizing the fundamental and in some cases necessary differences. In the emerging economy of the future, EPA's role is to act as a guidance system, helping to shape sustainable progress through the effective application of knowledge.

Network decision-making is the ability to The ability to encourage formal and informal network decision-making in the future is a critical need for interacting with more numerous and varied partners. However, unique individual contributions are still valuable and individual excellence and performance always needs to be nurtured and rewarded. Likewise, the bureaucracy still has a place in the agency of the future. The key is applying the appropriate solution to the problem.



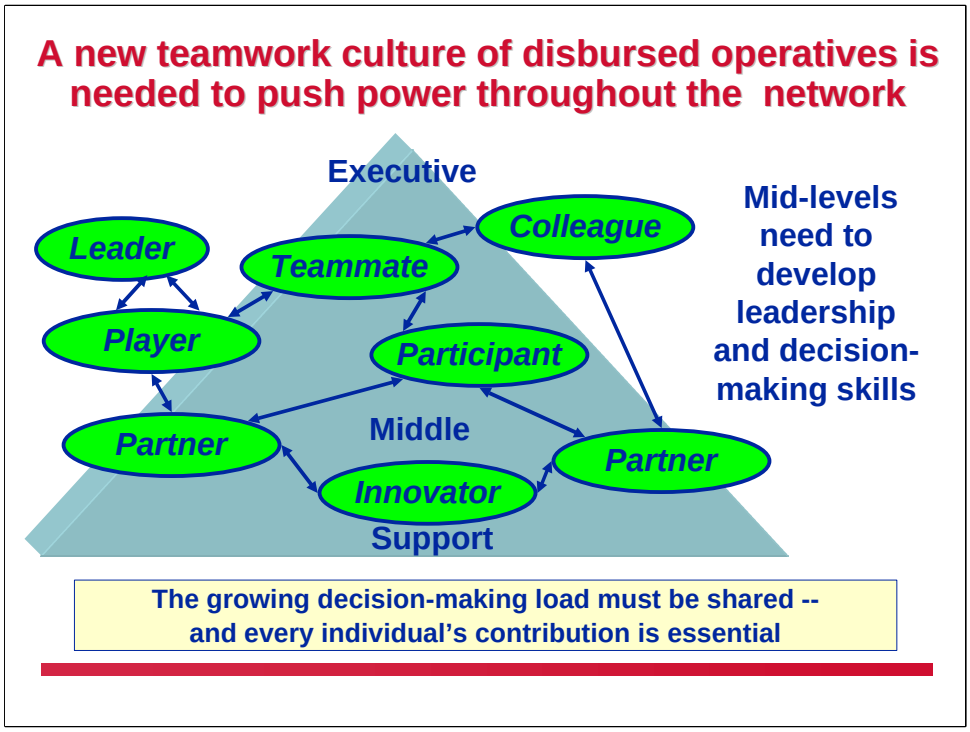
The EPA, like other government agencies, is organized in a traditional pyramid structure, albeit a flatter one than a few years ago. A few high level executives are supported by a large group of professionals, scientists, engineers, and lawyers, with a support services (secretarial-clerical) foundation.

The questions being raised throughout the agency about the role of the support services illustrates the impact of the new knowledge-driven economy on how we work. EPA managers have been unable to articulate a clear role for members of the support group.

A proliferation of PC's and the information power they provide has enabled a do-it-yourself mindset that all but eliminates the need for work that was formerly done by this group. Today, even senior executives prefer to do work themselves to keep up with the pace of accelerating change. The support services function today is expected to add value by thinking critically and applying that thinking to enhance executive decision-making as well as their own. Even in this group, leadership is fast becoming an important competency. Change efforts need to be directed at raising skill levels and increasing participation of these employees as well as bringing in staff who already have the needed competencies.

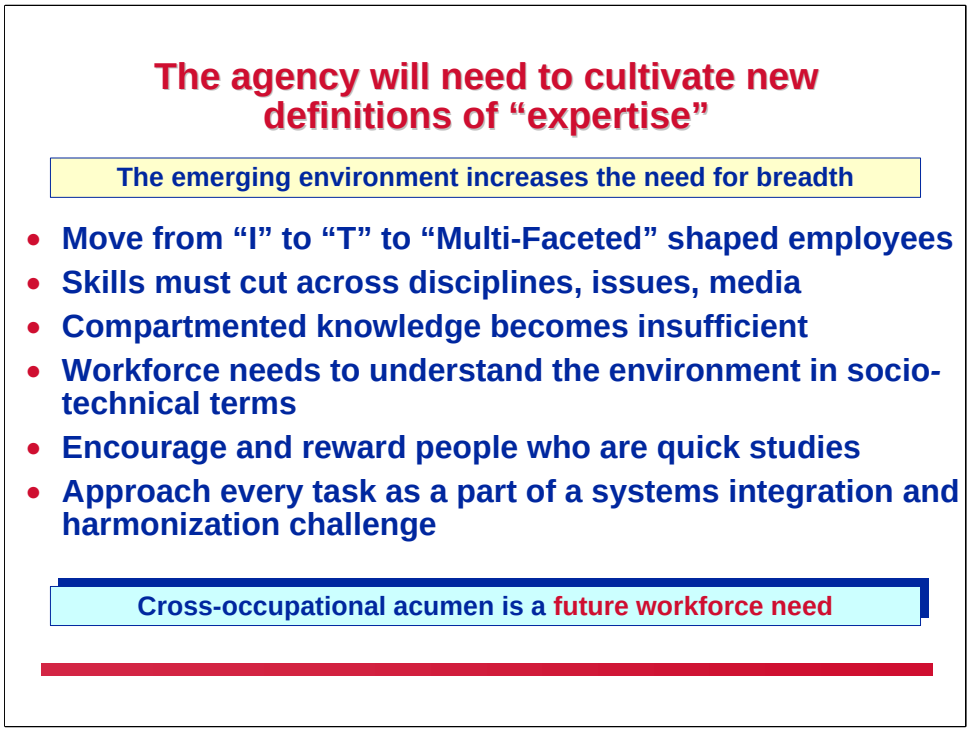
Those in the middle need to develop teamworking skills, and the ability to absorb new knowledge quickly. They need to be able to make decisions and act on them to keep pace with new environmental challenges. Leadership is an important new responsibility for this group too, in order to create synergies from a boundary-less organization structure.

A challenge for the executive group is to develop new collaborative skills to unleash the potential of the agency's staff as they work together in new and different ways. These new skills include the ability to work more alongside "support" and middle-level staff who will increasingly be in decision-making roles. In the new organization, individual roles shift from one project to the next. On one project, an individual may be the leader, on the next he or she may provide support. The ability to "let go" becomes a critical competency for leaders.



Although government's unique role may prevent it from ever operating like a business, it can adopt new ways of working to increase its new demands for environmental protection. The value of adding players to the agency's network increases explosively as more people are added. Leadership becomes an exercise in letting go as expert teams move from success to greater success.

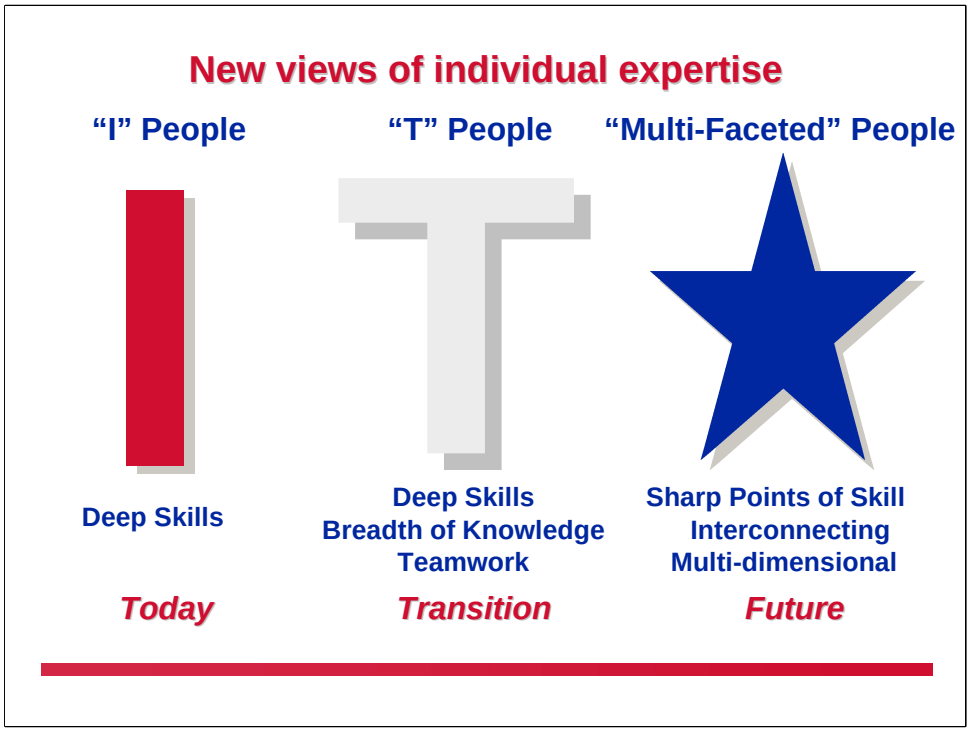
In a more networked agency, internal and external relationships are amplified in importance. However, a major challenge for the agency is to leverage its own internal knowledge resources by fostering a larger, more robust network of players from throughout every part of the agency Productive networks span occupations, grades, location, as well as a diversity of personal characteristics. Encouraging continual conversations results in learning that makes everyone smarter.



One of the agency's strengths has been the quality of its people. However, deep and discrete knowledge of a particular field of science, engineering or law, which to date has been so valuable, is, by itself, not sufficient for tomorrow. To build on their strengths, employees need to first develop an increased awareness of how their specialty fits into the broader environmental perspective. The broader perspective includes an understanding of the political, social, and economic aspects of the environment. We call people with this broad and deep perspective, the "T" shaped employee.

The "T" shaped employee will eventually need to evolve into a "Multi-Faceted" shaped employee who, in addition to developing a deep understanding of a discipline and a broad understanding of environmental issues and consequences, will need multiple additional competencies to complement and round out his or her specialty. This "Multi-Faceted" employee will be smart enough to ask the right questions, to be familiar with and able to draw upon resources outside of his or her discipline. He or she will be a quick study, continually acquiring and integrating new knowledge in multiple, sometimes unrelated areas, and will be comfortable in a variety of settings and tasks.

Cross-occupational acumen implies a shift in the way we think of specialization. Scientists will still need to have deep understanding of one or more fields, but they will also need to integrate and apply a much broader array of scientific, economic, social, and political concepts to solve environmental problems. They need to know how to maintain access to a wide range of "up-to-the-minute" information that affects their work.



This slide illustrates the transition in the kinds of expertise that employees of the EPA will need in the years to come. The key lesson for the workforce is that individuals must have deep enough knowledge of a variety of fields to know where to look outside the agency to get the skill they need--and know how to marshal the resources to obtain it. These people continually seek out new knowledge and apply it in teamwork and network interactions with others inside and outside the agency.

Breaking down organizational boundaries will provide the kind of environment where this transition can begin to evolve. By working in new multifunctional teams, by actively participating in network interactions, and taking calculated risks, individuals learn in more powerful ways than any training class could provide. This self-directed type of learning is exciting, it improves motivation and drives a desire to learn more.

The obligation for managers is to create the kind of environment and culture that fosters continual learning. Innovative new ways to preserve and protect our world will inevitably follow.

The nature and distribution of power in the world is transforming. By bringing others into the agency's network and forming new kinds of alliances, the agency's influence is expanded and strengthened. ONE THING IS TO UNDERSTAND CUSTOMERS AND THEIR ENVIRONMENTAL EXPECATIONS. The agency already works with states, decentralizing environmental protection. It needs to continue in this direction, increasingly incorporating citizens into the network.

EPA takes on the role of educator, not just in terms of general environmental education, but in teaching actual skills to the public. In this way members of the public, now more environmentally aware, become virtual members of EPA's networked workforce. Thinking of the public as "honorary EPA employees" requires a new mindset requiring new approaches to training and teamwork. Once people feel they have been heard they are willing and eager to communicate the agency's mission outside.

The next phase is to develop an increasingly global system of diverse actors on multiple levels from groups that may include transnational corporations, environmental groups, NGO's, and others. EPA's focus becomes broader and boundaries between corporate, private, domestic and foreign begin to blur. The ability to build and learn from diverse relationships and create new knowledge will contribute to agency success.

Those who are able to co-create coalitions, or work through formal and informal networks to bring groups together to address environmental issues, add an essential capability to tomorrow's agency. Nurturing the individual who demonstrate this competency and overtly developing it in others begins to build the foundation needed to leverage the power to influence environmental issues globally and locally.

Recognizing the current competencies of the workforce provides a point of departure for EPA to build new capabilities for the future. By reaching out and expanding its network of partners, the agency improves the quality and quantity of information and decisions improves. A challenge for the EPA is to mobilize this amorphous network into action to protect the environment.

The private sector is developing new models for operating in the new economy, and these new models create new opportunities for success, but they also demand new kinds of skills and competencies in the workforce. For example to capitalize on internal participation, the company Knowledge Adventure, Inc. didn't have the existing structure to support a new kind of business-to-business effort to sell a software development tool it originally developed for its own use. The solution was to spin out a new company, Worlds Inc., with 80% of the equity going to employees of the hugely profitable new business. Letting go of its best people and best ideas is counterintuitive, giving away ownership can lower net return, but new models can create dramatic successes. Can EPA cultivate the skills in its workforce to recognize and seize new opportunities in this way? Can the EPA privatize any of its operations to enhance their effectiveness?

Another company, Open Source Software, looked outside for its innovation. They began giving their software away and made the source code available for modification and for resale by whomever wanted to sell it. The resulting software has become more powerful than most of the comparable products on the market. Could such a participative R&D model work for the EPA scientific and engineering professionals to create new tools and approaches for environmental protection?

Government needs to develop in greater congruence with the business world, recognizing where it must change and where it cannot change. Developing new incentives to mobilize action, analyzing tradeoffs between risks, and taking decisive action based on the results are key to success in the new economy. Incorporating sophisticated modeling techniques to assist in understanding complex social and economic impacts of environmental phenomena help to improve communication and decision-making. The bottom line is that new approaches must be constantly developed and applied--some will work and some won't. The system needs to support this kind of relentless innovation if it is to continue to excel into the future.

Catalyzing combinations of actors, or the ability to recognize and bring the right combinations of people together just-in-time, from inside or outside the agency enables the EPA to deliver solutions that increasingly require more innovative approaches.

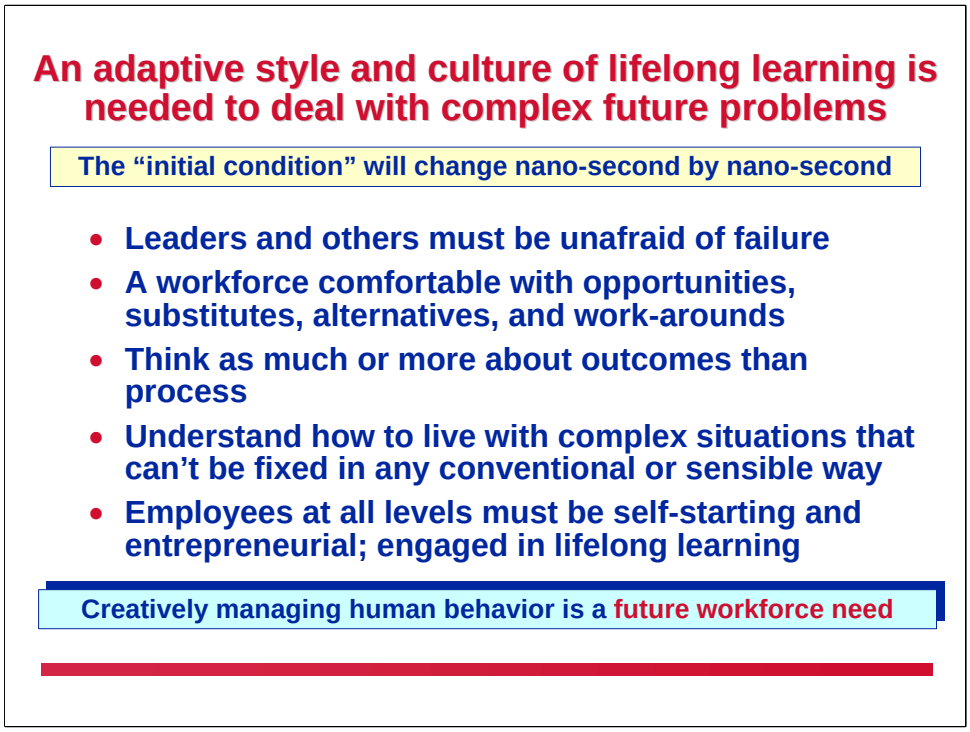
Consensus on almost any issue becomes increasingly difficult to mobilize as the number of constituent identities grows. The objective now is to engage a broad diversity of individuals and voices, to learn to foster trading and cooperation, and to form mutually beneficial relationships. Unless the EPA has the participation, the hearts and the minds of every member of the community it serves, it cannot be fully successful. Every segment of the population, no matter how small must feel a part of the environmental protection mission.

Customization, or demassification, becomes the norm--bringing with it increased complexity and diversity. Organizational structures and tools for legitimizing and accommodating a minority-based democracy need to be created.

Creating diverse networks of multiple levels of internal and external players is another key to rapid response to a changing environment. By ensuring widespread inclusion and participation of genders, races, ethnicities, as well as rich and poor, urban and rural, the agency creates a synergy of ideas that enables it to meet the demands of accelerating environmental issues and threats.

Some of the factors necessary for success include trust and mutual respect; and an ability to learn from the inevitable conflict that is necessary for positive change. In addition, as we move further away from the Second Wave world, tensions between those in each tier inevitably escalate as the power shifts to those in the higher tiers. Dealing with these conflicts will be a significant challenge in years to come.

Creating shared minority power begins with the competency to understand the multiple cultural dimensions of every issue. It includes providing every player with the information he or she needs to make decisions as well as bringing together multiple and changing minority groups to develop solutions to the problems that affect them. Ultimately, it is seeing the enriched diversity as an opportunity for human development.



Accelerating change produces unique challenges. Today's useful knowledge is obsolete tomorrow. The resulting need is for continual, lifelong learning to be incorporated into the organizational culture. Time becomes a critical variable in the emerging society, where accelerating change demands faster development of solutions.

Government agencies are particularly challenged with regard to rapid change. The government bureaucracy was designed to evolve slowly--a feature that to date has served it well. In the future, by recognizing where it needs to change and adapt to the emerging environment, the agency can determine when to outsource, when to decentralize, and when to shore up its own competencies.

A concerted focus on outcomes is increasingly important. Recent initiatives to improve measurement of outcomes are important, but the goal is far from accomplished. Outcomes must be communicated in language that people understand if their support is to be engaged.

Striking out into new territory is risky. Conflict and mistakes may make situations more complex, but by enlarging its knowledge network, productivity, measured in terms of outcomes and impact on the environment, can improve dramatically. Letting go can be a powerful competency too.

In this environment, everyone needs to take charge of and take responsibility for their own careers and commit themselves to lifelong learning. Everyone who brings this mindset to the agency is a vital player, valuable for their unique contributions.

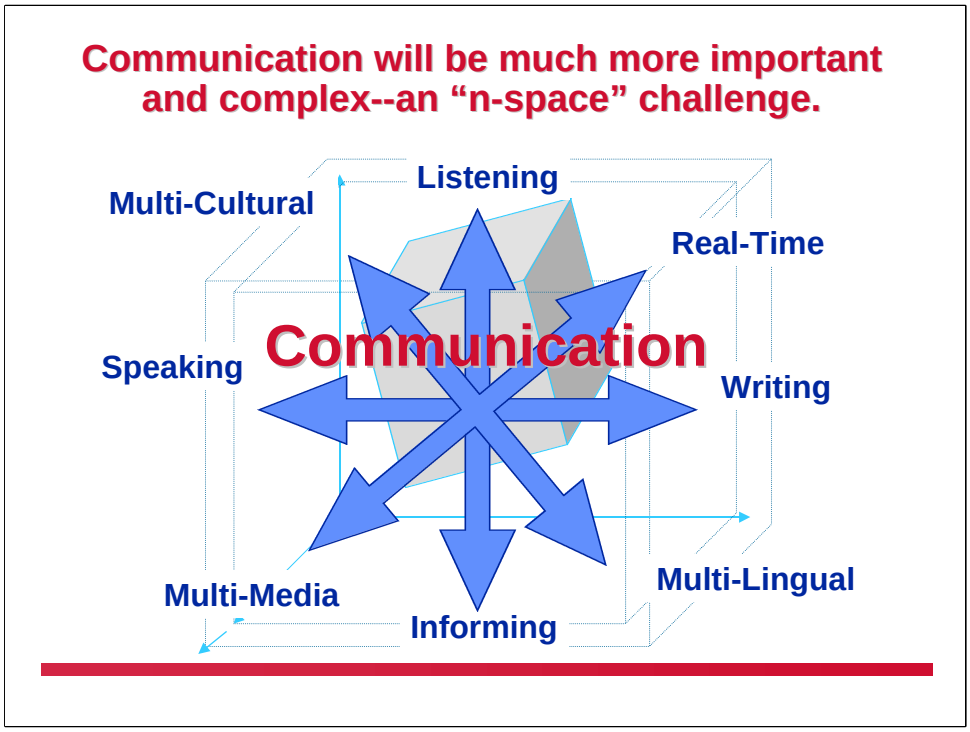
Creatively managing human behavior is fostering a work environment where each individual is able to produce his or her best work. It appreciating different work styles and providing access to the tangible and intangible tools required for optimum effectiveness. It also means removing organizational involves obstacles to productivity and effectiveness.

The agency has been successful to date at delivering its message and in changing behavior. In the future, the collective knowledge of the agency must be shared in user-friendly ways in order to produce desirable impacts on the environment. Scientific and technical concepts and measures of effectiveness need to be translated into terms that resonate with the general public.

The future poses dramatic new communication challenges, however. We are a more diverse society than ever before, bombarded with more and more sophisticated messages from every angle. If it is to continue to provide sophisticated environmental protection, the agency needs to learn to communicate its messages to multiple diverse audiences by multiple means and in multiple languages. It means listening better, writing better, and speaking groups and individuals. Communicating with its public requires a new mindset about what it is communicating, why it needs to communicate, and how it will accomplish its objective. The challenge is to make the agency's message known at the individual level.

Agency employees are the key to enabling the EPA to communicate successfully. At every level, clear, complete and open communication is a critical skill. Technology provides invaluable support for global communication, but never replaces widespread personal commitment by the entire workforce. In addition to being able to express themselves clearly, employees need to be comfortable learning and using constantly changing communication tools and technologies.

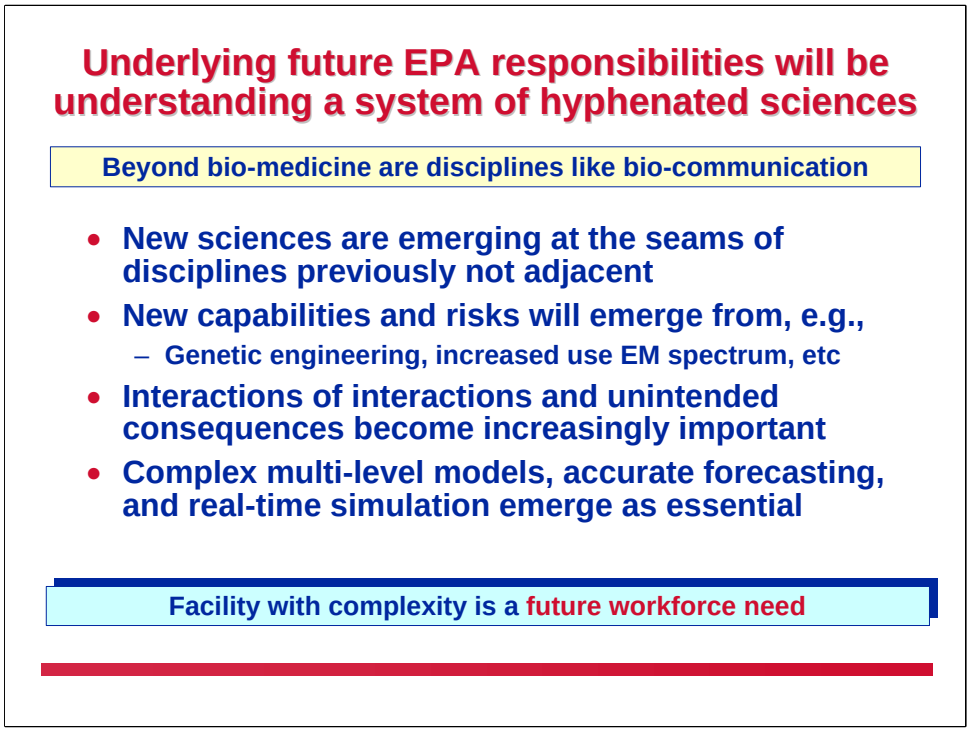
Multi-media acumen is the competency to communicate and be understood by diverse audiences using most appropriate format. It includes being familiar with application of communication technologies to improve message clarity as well as the ability to assess and understand audience needs. A mindset of continual, open communication is an essential prerequisite.



The dimensions within which we communicate are continually expanding in number and complexity. Effective communication depends on a broad range of skills and abilities, including the ability to gather enough information to understand one's audience in order to present a message that is clear and complete.

To communicate successfully, the agency and its employees need to have a new repertoire of competencies ready to make themselves understood. The public is increasingly sophisticated and has access to more information than ever before--some of it reliable, some worthless. One role of the EPA is to help them to make sense of the deluge.

The mass culture of the industrial age gives way to a more individualized, customized, "demassified" culture, so that today we each prize our differences. To communicate with large numbers of people in this kind of culture, it is helpful to rely on the technology of emerging Internet and multimedia applications, for example, which can provide useful two-way channels for customized communication in any number of modes and styles.

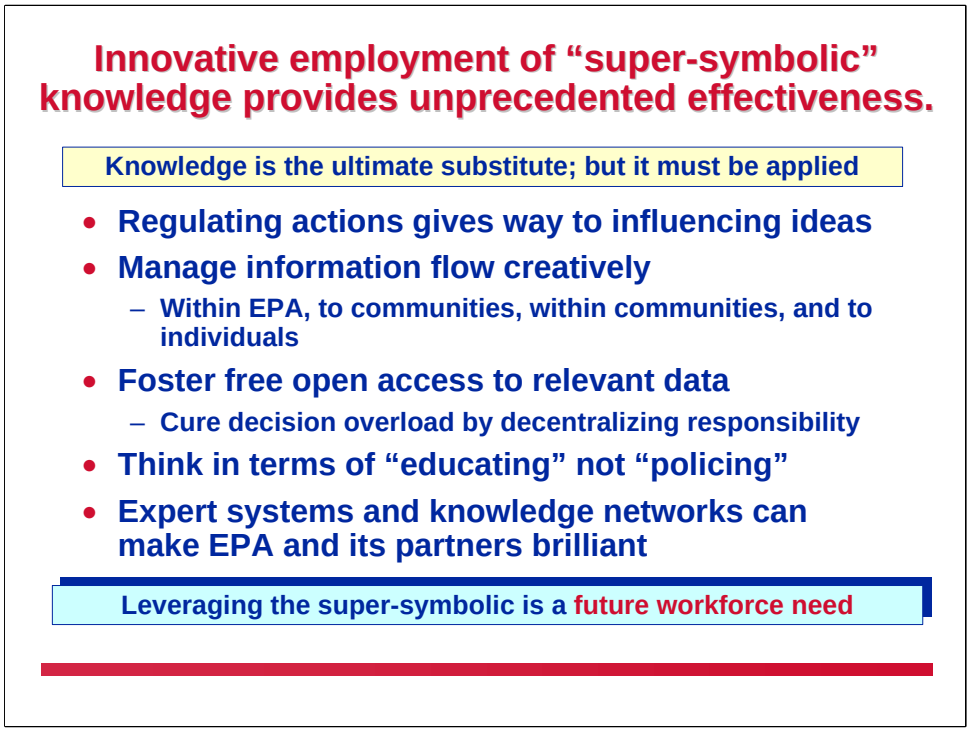


Understanding interactions in multidisciplinary terms is critical to understanding our complex environment. Environmental threats come less and less from a few large source polluters and now more often from the combined threat of many diversified smaller sources and individuals. Its grounding in good science, developing a broader understanding of the interplay between environmental components, contaminants, society, the economy, and the earth provides a starting point on which new science needs to be built. We already see fields like bio-medicine, bio-communication, astro-biology, and tele-medicine. What is missing today, are those people who can integrate the sciences of multiple combinations of environmental interactions.

In order to make the transition to "Multi-Faceted" EPA people (as described on slide 199), the agency needs to develop altogether new definitions of expertise that include things like complexity and chaos theory. The agency can begin to develop this competence today by hiring generalists with an aptitude and enthusiasm for learning quickly on the job and thinking on their feet.

Biogeneticists and EM experts need to respond to questions that arise out of news headlines, like "What are the implications of shipping genetically engineered agricultural products around the world?" And "what does it mean when I read that cell phones have been shown to increase blood flow to the brain?"

Facility with complexity will be an important future competency. It includes a tolerance for uncertainty, the ability to admit not knowing all the answers, and a willingness to let others supply them. It is acknowledging that knowledge is continually decaying and that new knowledge is being created at an even faster pace.



All kinds of information (i.e., from scientific research to advertising hype) plays a growing role. The Tofflers assert that what is happening is the rise of an entirely new "system for wealth creation," which brings with it dramatic changes in the distribution of power. The new system for making wealth is totally dependent on the instant communication and dissemination of data, ideas, symbols, and symbolism. We are now in a "super-symbolic" economy.

Trying to regulate an increasingly complex environment becomes an exercise in futility. Knowledge, as the ultimate substitute, can play a critical role in providing alternative solutions. Actively leveraging its knowledge to educate, shape ideas and influence behavior is one solution to issuing new regulations to control actions.

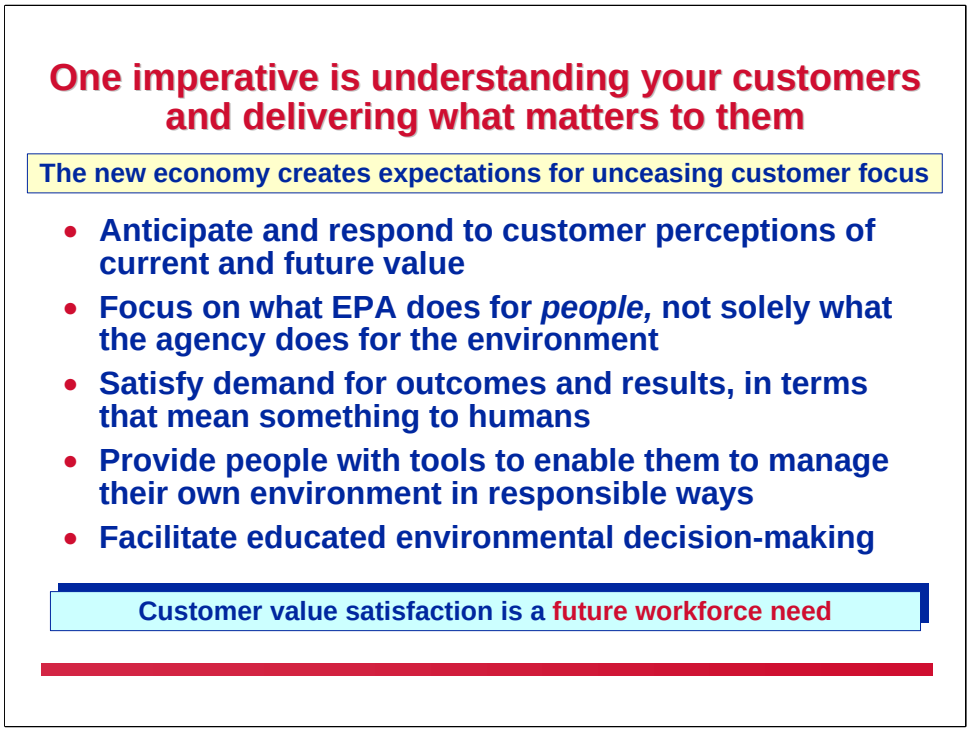
The EPA has vast information resources carried in the heads of its employees, in file cabinets, and on bookshelves that are not accessible by the rest of the agency--and this information can be its most valuable resource. By using new technologies to make those resources more widely available within the agency and to constituents and stakeholders, it can convert the information into knowledge to improve environmental outcomes.

Sources of information proliferate. EPA must know the location of these sources, how to access them, translate them and use them to create something meaningful to guide the public for positive environmental impact.

The future EPA serves as a guidance system, providing taxpayers and businesses with a better understanding of consequences and repercussions. Global and local networks of concerned players provide support and solutions to environmental problems as boundaries between the public and private sector blur.

By intelligent use of expert systems and knowledge networks, EPA and its internal and external partners can collaborate to develop innovative ways to foster sustainable growth.

A competency of leveraging the super-symbolic means using information as currency to accomplish agency objectives. It means applying knowledge to influence outcomes that support the EPA's mission.



Customers are becoming accustomed to increasingly high levels of service and product innovation from business in a global market that is able to meet their individual needs. It is not sufficient to wait for customers to request support or services. Customer needs ought to be anticipated.

Taxpaying government "customers" likewise expect value for their tax dollar. Value from the EPA means, importantly among other things, developing innovative solutions that protect the environment while enhancing commerce. It means gathering knowledge from a wider variety of sources and involving more participants more deeply in the process.

Value is also communicating with the general public on science and technical concepts and measures of effectiveness in terms that they can understand.

Customer value satisfaction is the competency to understand customers deeply enough to anticipate and innovate with them to meet needs that may not have been articulated. It means working with and constantly learning from customers to help them achieve their goals.

Rules can no longer address all of the possible sources of environmental impact. By blindly enforcing one set of rules for all actors, it can miss the larger emerging threats. In the words of Alvin and Heidi Toffler, increasingly in the emerging society "one size misfits all". We are no longer an industrial-age mass society--we are a knowledge-based demassified society.

Outcomes are what matters most. Enabling employees to negotiate mutually beneficial solutions that meet established minimum outcome standards can have a more powerful impact on the environment. Even beyond mutually beneficial solutions is the increasing importance of customized solutions, the development and enforcement of which demand a whole new set of skills. Customization of the rules is key because not every actor has the same values, and thus won't respond to the same incentives or penalties

To make informed decisions, employees need to have access to the agency's collective knowledge. Cultivating and rewarding the ability to make educated decisions and take calculated risks is an important task for agency leadership.

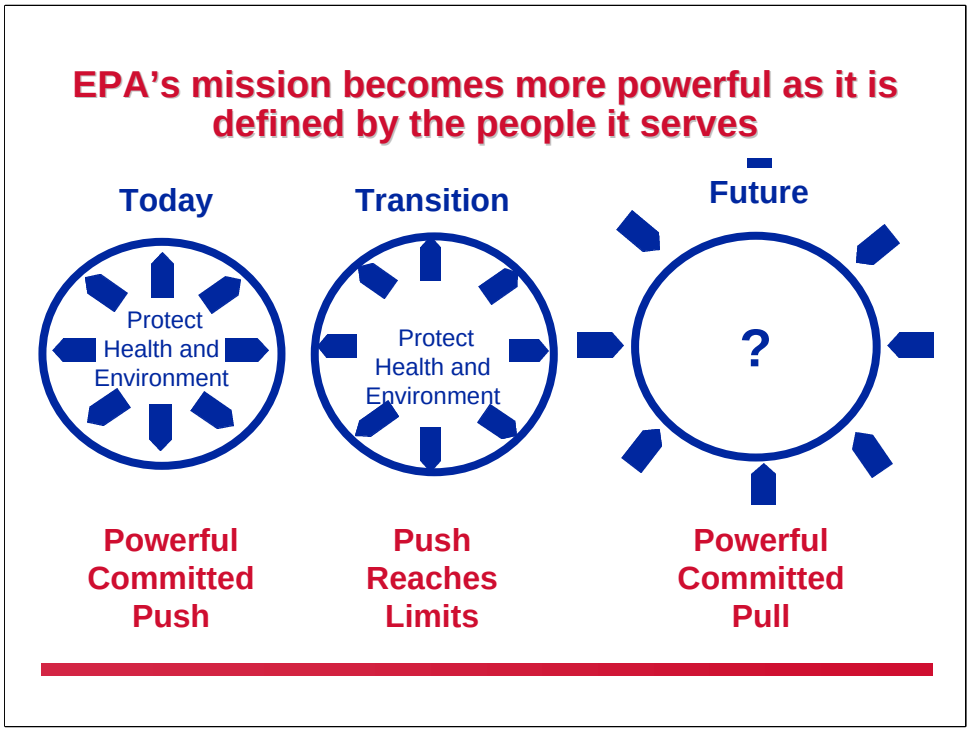
Responsible individualism is the competency to articulate one's own personal ideas to other individuals and to groups--adding to the heterogeneity of the group and the creativity of its solutions. Responsible individualism is also the ability to assess the individual contributions of others in a constructive way. It is knowing when and how to influence others to achieve the agency's desired outcomes.

Environmental threats are becoming more global. If the agency rises to the occasion and takes on a more global perspective, its influence on global environmental affairs can increase. With adequate information and clear communication, part of the value EPA can add to the global environment beyond US borders, which will also have an important positive impact at home, is to help developing countries make their transitions from First and Second Wave patterns to the Third Wave without making the same environmentally destructive mistakes the Western world made in its industrialization.

EPA needs to ensure that it directs the right information to the right place so that effective education occurs. Of course, there is much to learn from the experience of others as well, and the agency needs to constantly learn from its neighbors' experiences.

The Montreal Protocol, the Kyoto Protocol, and other international agreements are important steps to developing a global approach to environmental protection. What happens in the event of disagreement or violation? The potential for "wave conflict" between countries at different stages of their evolution from agricultural to industrial to knowledge-based is ever-present. By effective collaboration with other countries, the EPA can help to maintain cooperative relations by, for example, preventing or resolving international conflict over environmental issues such as trans-border pollution or ozone depletion.

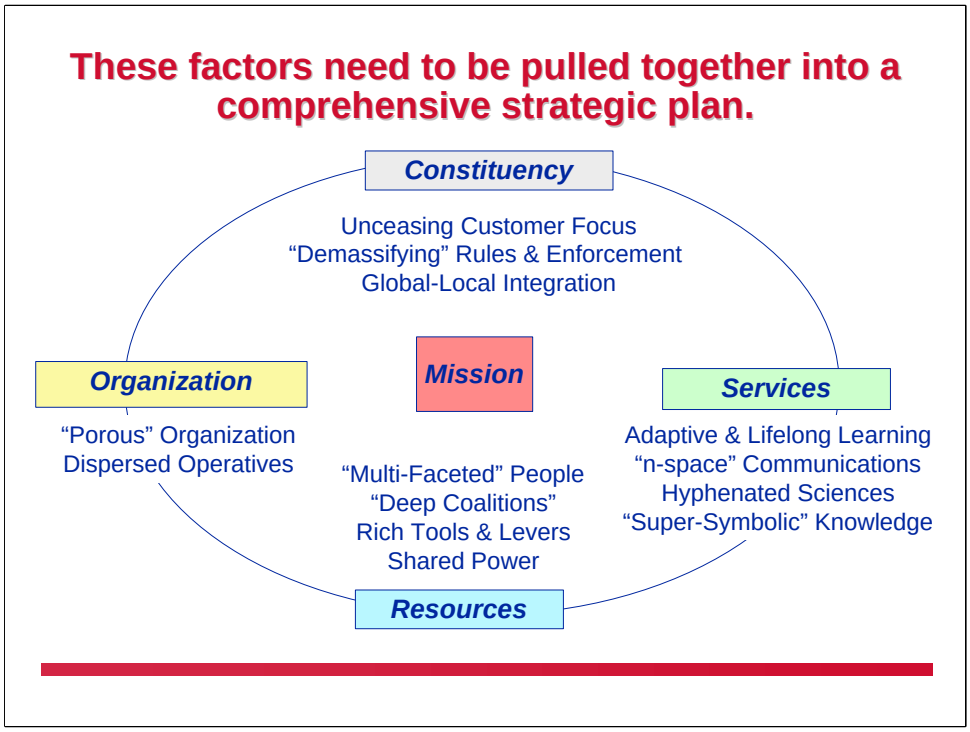
Integrating global and national activity means bringing knowledge from around the world to bear on environmental problems at home. It means taking a worldwide perspective and working with global partners on environmental preservation and support for the benefit of all. It is also actively anticipating others' needs and sharing our experience and knowledge about how to overcome environmental concerns.



To date, the agency's efforts have been directed towards writing regulations and then enforcing actions against those that would pollute--that is to say that the mission has been "pushed". There is little doubt that this approach has been effective. Because of the EPA's directives and actions, mass pollution has been dramatically reduced. The nation's air is cleaner and lakes, rivers, and streams are in considerably better shape than they were 25 years ago. But we are reaching the limits of effectiveness of the push strategy.

Society is becoming more fragmented, individualized or "demassified", and is less tolerant of "one size fits all" rules for situations with consequences that are not obvious. As the number, types and interactions of potential pollutants and polluters increases, it becomes increasingly difficult to make the already massive volumes of environmental rules and regulations apply to every possible environmental threat. We are reaching the limits of effectiveness of mass environmental regulation.

The EPA's future mission will be one that is "pulled" directly from the American people by the agency--what the people want and need in terms of environmental protection and what the outcomes ought to be. With this information, the agency provides the appropriate support and guidance to enable people to create the kind of environment that they said they want.



The EPA, like every government agency, can only succeed through the efforts of the people in its employ and in its networks. In order to facilitate the agency's transition to the 21st Century, the recommendations for the agency's future presented here need to be integrated into the agency's strategic plan and communicated throughout the agency. The Office of Administration and Resource Management plays a vital, foundational role in the agency's larger strategic plan, and in guiding EPA's transition effort through effective management and integration of the agency's human, financial, and physical resources.

The groundwork for accomplishing a successful transformation of the EPA will be building skills and fostering diversity, providing superior customer service and ensuring financial integrity, and also by building safe and healthy workplaces to help strengthen the community.

In order for human resources strategy to be successfully integrated with larger agency strategy, we must recognize that the core values for human resources are essentially the same as those for the other, "media"-specific and other substantive components of the agency. These values must be communicated and understood throughout EPA. They are centered around the overarching value of putting people first. They also include the critical values of accountability, integrity, teamwork, valuing diversity, rewarding results, superior customer service, partnerships, open communication, and lifelong learning. It is not accidental that these human-resource-focused values also capture the larger values of the agency and all its substantive components -- they represent the same approaches that will make successful the EPA's future efforts to protect our air, our water, and all of our natural environment.

To ensure its ability to continue to protect the environment in the future, the EPA needs to develop a human resources strategic plan that is fully integrated into the larger agency-wide strategic plans.

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