

EPA's Ecological Research Strategy & Multi-Year Plan

February 7, 2006



RESEARCH & DEVELOPMENT

Building a scientific foundation for sound environmental decisions

Office of Research and Development



- 1,950 employees
- \$600 million budget
- \$60 million extramural research grant program
- 13 lab or research facilities across the U.S.
- Credible, relevant and timely research results and technical support that inform EPA policy decisions

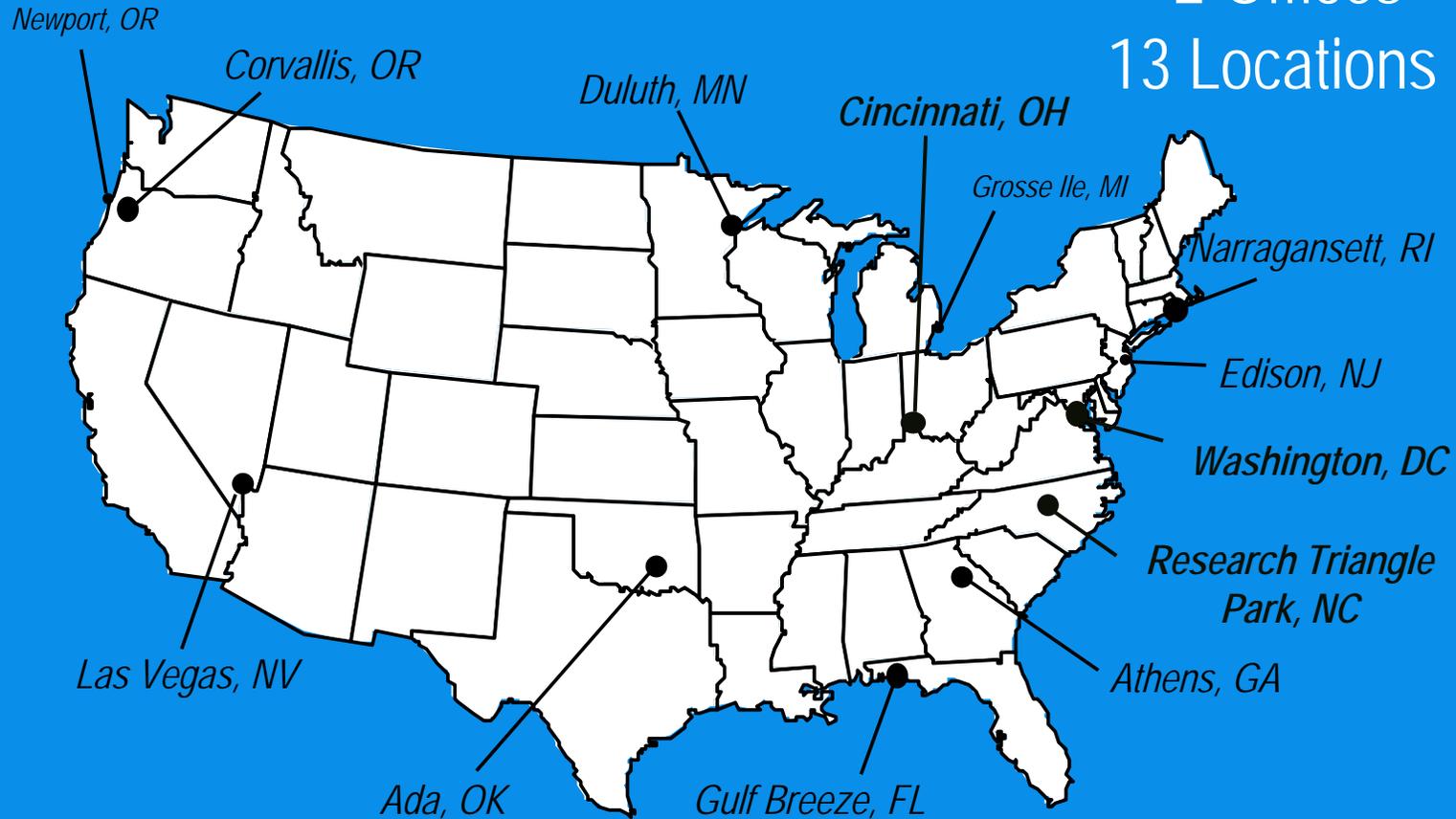
ORD Locations

3 National Laboratories

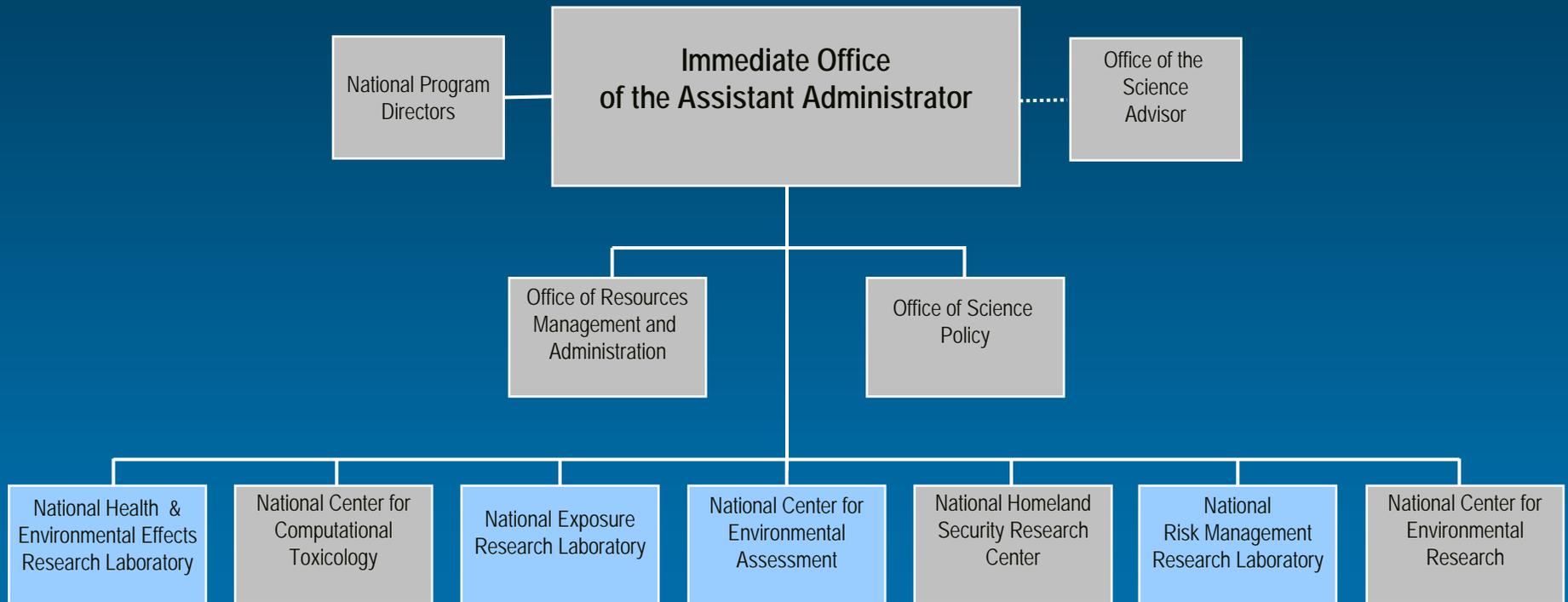
4 National Centers

2 Offices

13 Locations



Office of Research and Development



Multi-Year Plans and GPRA

- Initiated in 2001
- Plan the direction of research 5 - 10 yr period
- Re-assessed annually
- Framework for integration across labs & centers
- GPRA oriented
 - Long-term Goals
 - Annual Performance Goals
 - Annual Performance Measures

MYP's & EPA's Strategic Goals

- ORD's MYP's linked to Agency Goals
- EPA's Strategic Goals
 - 1. Clean Air
 - 2. Clean and Safe Water
 - 3. Land Preservation and Restoration
 - 4. Healthy Communities and Ecosystems
 - 5. Compliance and Environmental Stewardship
- Goal 4 includes core & problem-driven research

Multi-Year Research Plans

- Air Toxics
- Contaminated Sites and Hazardous Waste
- Drinking Water
- Endocrine Disruptors
- Global Change
- Mercury
- Particulate Matter
- Safe Pesticides/Safe Products
- Water Quality
- Ecological Research
- Economics & Decision Sciences
- Human Health
- Pollution Prevention

**Managed by National
Program Directors**

Predominantly Core Research

Predominantly Problem-Driven Research

Ecological Research 4

Human Health 4

EDCs 4

Climate Change 4

Water 2
•Drinking Water
•Water Quality

Air 1
•PM
•Ozone
•Air Toxics

Contaminants 3,4
•Contaminated Sites
•Safe Food
•Safe Pesticides/Safe Products

Others 4
•Mercury
•Pollution Prevention



Predominantly Core Research

Predominantly Problem-Driven Research

Ecological Research ⁴

Human Health ⁴

EDCs ⁴

Climate Change ⁴

Water ²
•Drinking Water
•Water Quality

Air ¹
•PM
•Ozone
•Air Toxics

Contaminants ^{3,4}
•Contaminated Sites
•Safe Food
•Safe Pesticides/Safe Products

Others ⁴
•Mercury
•Pollution Prevention



Ecological Research MYP

- Current plan written in 2003
- Being revised for 2006 - 2015 time frame
- Revisions based on
 - OMB examination (and reexamination)
 - External Program Review held in March 2005
 - Desire to be more ecologically outcome oriented
- Plan is now in internal review

Long Term Goal 1

National policy makers will have the tools and technologies to develop scientifically-defensible assessments of the state of our nation's ecosystems and the effectiveness of existing national programs and policies

Outcome #1: States and national policy makers use a common monitoring design and appropriate ecological indicators to determine the status and trends of ecological resources and the effectiveness of existing national programs and policies.



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Long-Term Goal 1 Questions

- What statistically-valid, scientifically-defensible frameworks are needed to measure, assess, and report on the status and trends of ecosystem condition at regional and national scales?
- What sensitive and reliable ecological indicators are needed to measure changes in ecosystem condition over broad regions of the country?
- How can environmental monitoring help evaluate the effectiveness of national efforts to protect and improve the environment?

Long Term Goal 2

States and tribes apply improved tools and methods to protect and restore their valued ecological resources

Outcome #2: States, tribes, and relevant EPA offices have improved their ability to determine causes of ecological degradation through the application of recently developed (within the previous 5 years) ORD causal diagnosis tools and methods, resulting in positive environmental outcomes.

Outcome #3: States, tribes, and relevant EPA offices have improved their ability to forecast the ecological impacts of various actions through the application of recently developed (within the previous 5 years) ORD environmental forecasting tools and methods, resulting in positive environmental outcomes.

Long-Term Goal 2 Questions

- How can states and tribes best assess the condition of their ecological resources?
- What are the causes of degraded and undesirable conditions?
- How will the condition of ecological resources and the causes of degraded conditions change in the future?
- Which management practices are most successful for the protection and restoration of ecological resources?

Long Term Goal 3

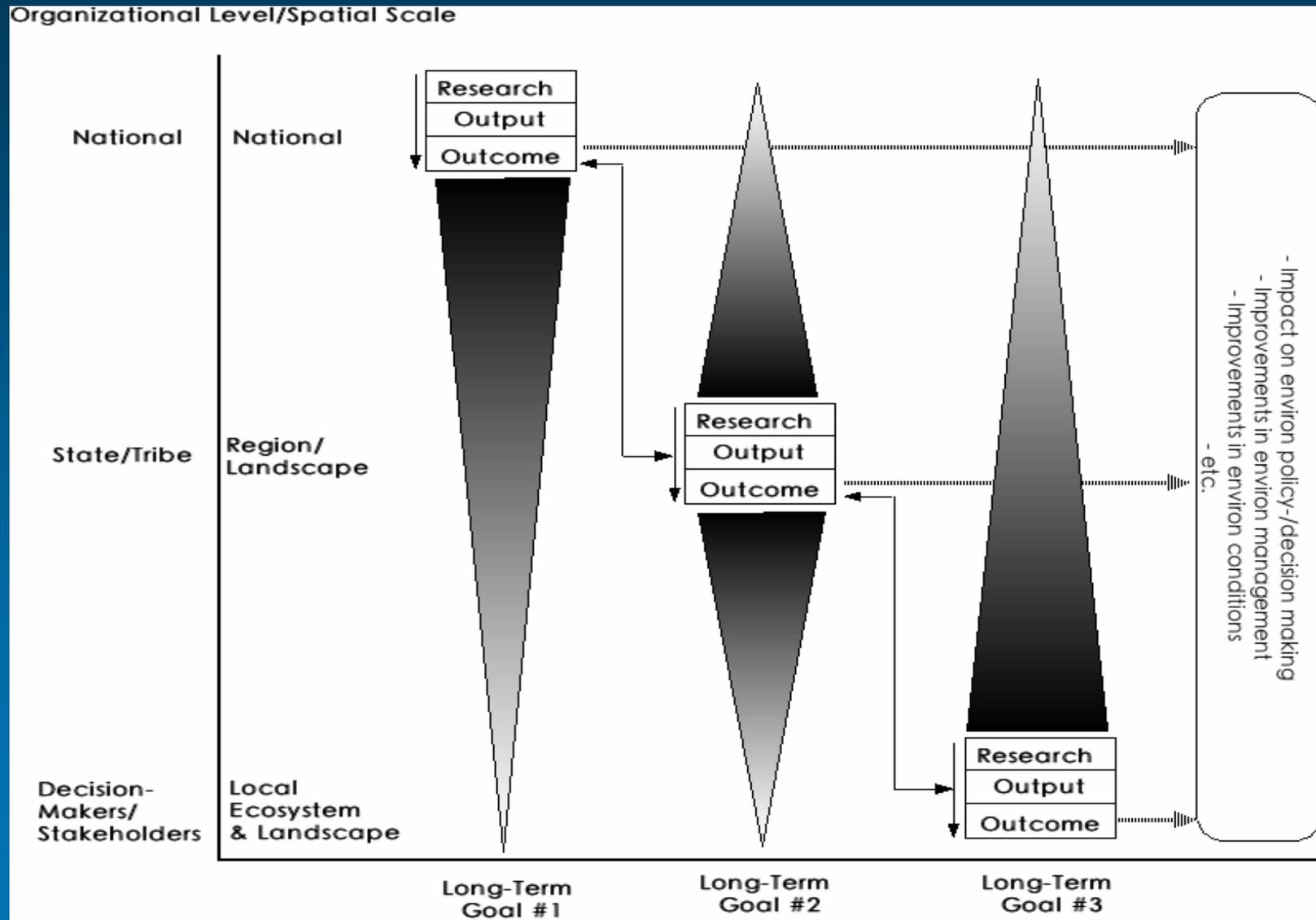
Decision-makers use tools to make informed, proactive management decisions that consider a range of choices and alternative outcomes, including effects on ecosystem services.

Outcome #4: States, tribes, and relevant EPA offices have improved their ability to protect and restore ecological condition and services through the application of recently developed (within the previous 5 years) ORD environmental restoration and services tools and methods, resulting in positive environmental outcomes.

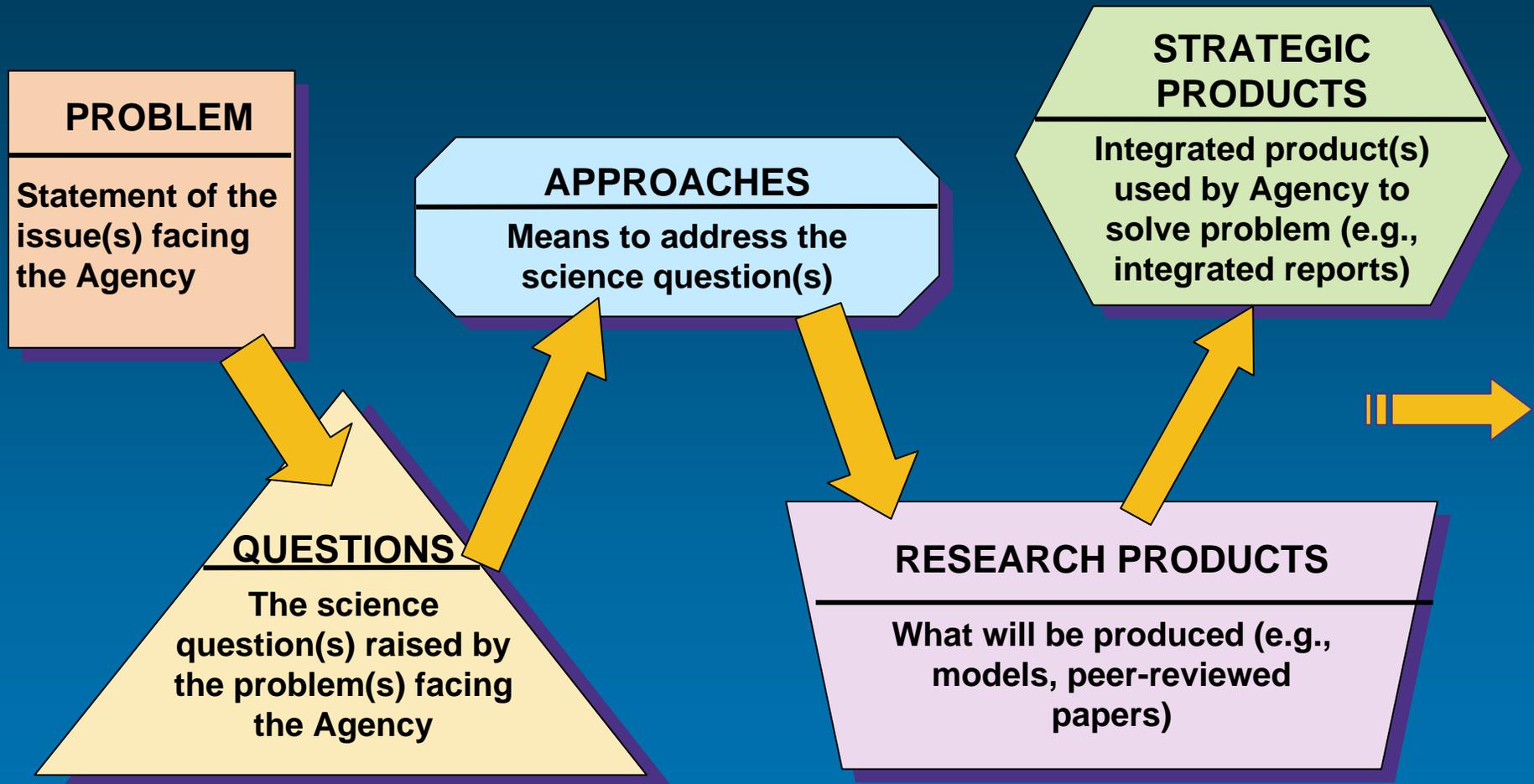
Long-Term Goal 3 Questions

- What set of ecosystem services are most important to resource managers?
- What are the range of choices managers have to reduce the loss of ecosystems services?
- What are the available approaches to restoring ecosystem services?
- What are appropriate spatial and temporal scales for restoring ecosystem services?

Interaction of Long-Term Goals



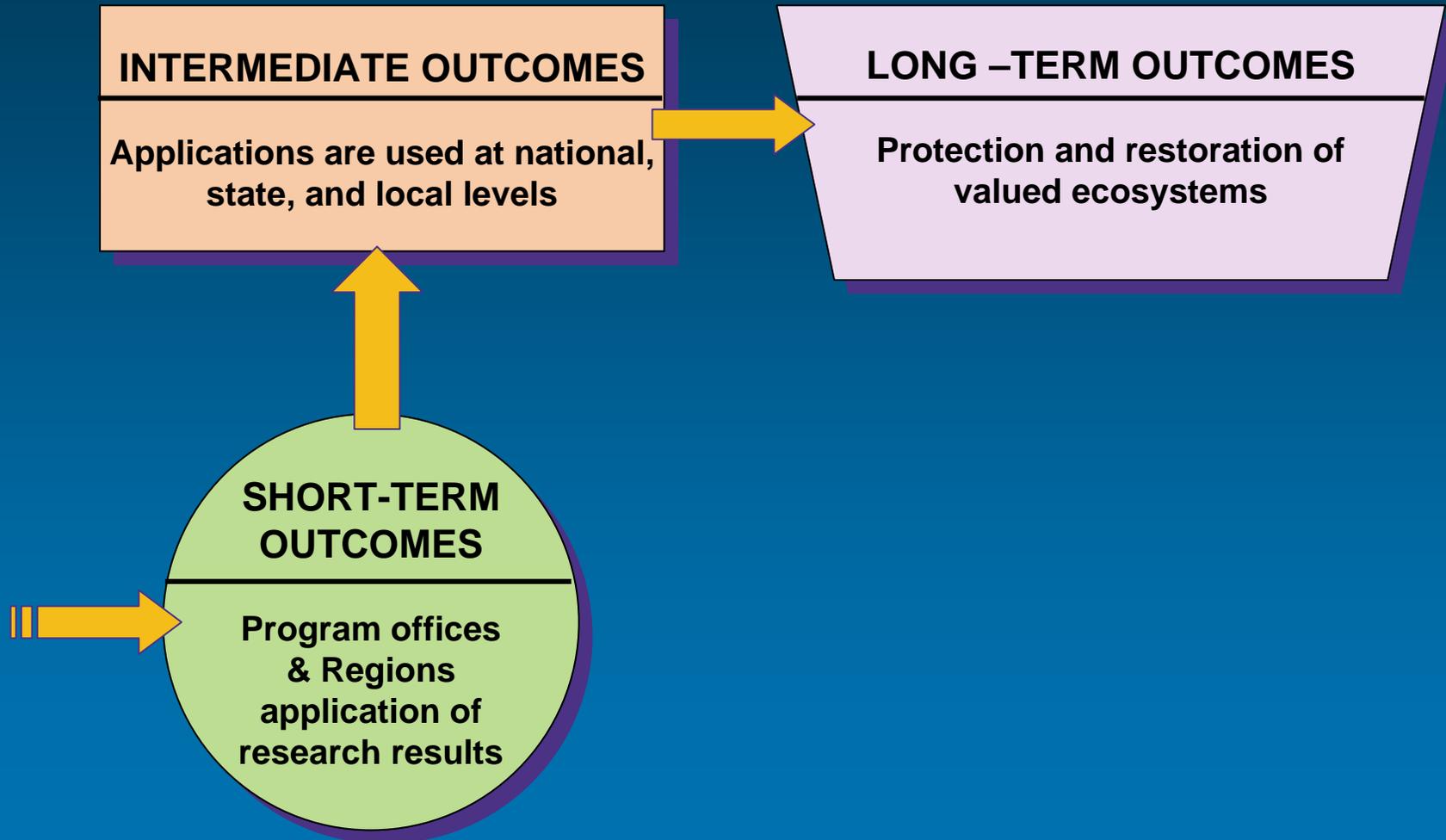
Approach to Research



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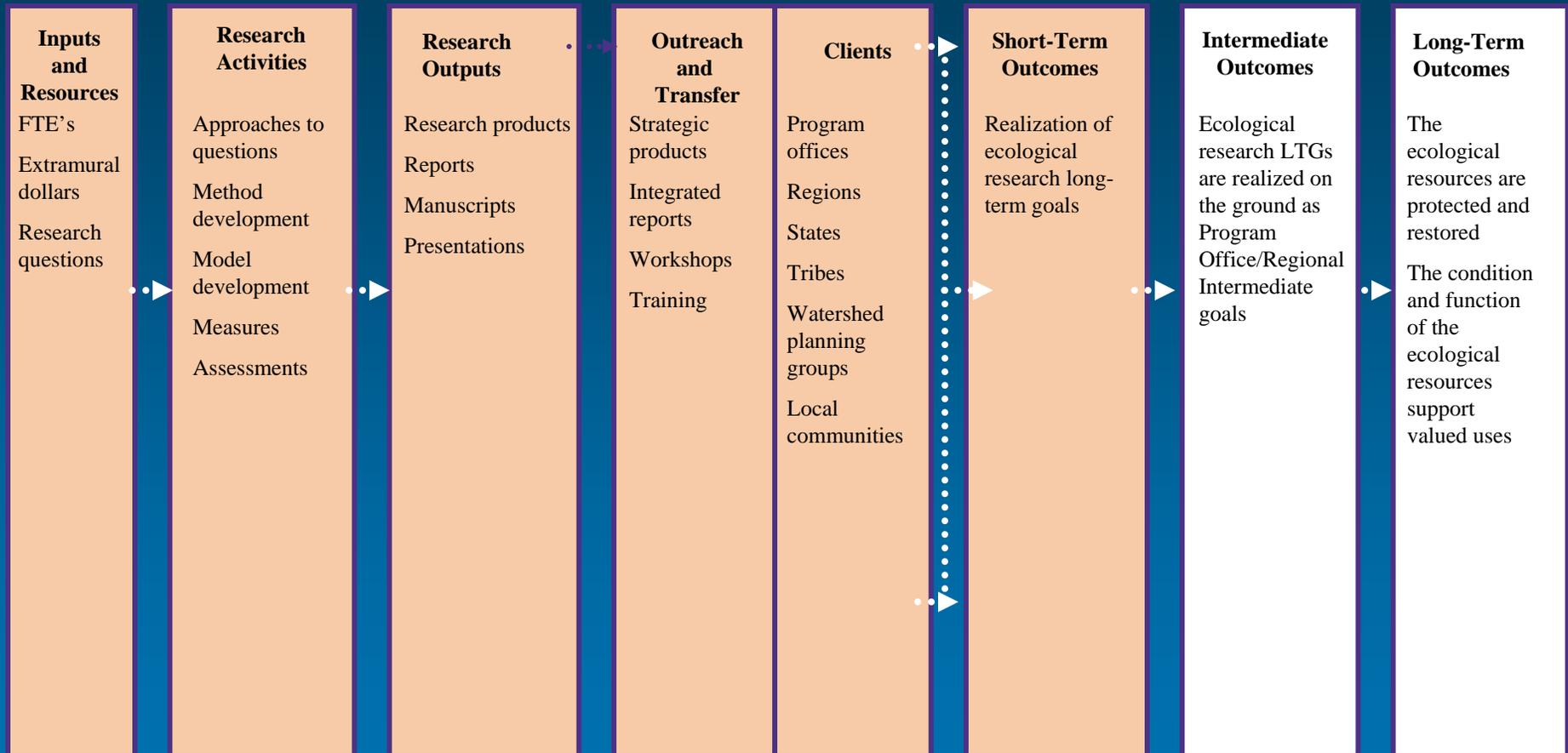
Approach to Research (Cont'd)



ORD's Ecological Research Program

ORD Ecosystems Protection

Outcomes and Environmental Results



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Summary of Bibliographic Materials Produced by the Ecological Research Program (2000-2005)

- Total publications: 1762 articles, reports, book chapters and books
- Total number of journals with articles: 380
- Journals most frequented (20 or more articles I five years):
 1. Environmental Monitoring and Assessment (151)
 2. Environmental Toxicology and Chemistry (59)
 3. Ecological Applications (39)
 4. Environmental Science and Technology (37)
 5. Journal of the North American Benthological Society (36)
 6. Environmental Management (34)
 7. Hydrobiologia (31)
 8. Journal of the American Water Resources Association (30)
 9. EOS/Transactions of the American Geophysical Union (28)
 10. Limnology and Oceanography (27)
 11. Estuaries (25)
 12. Human and Ecological Risk Assessment (20)
 13. Ecological Modeling (20)
- Total number of EPA reports: 133
- Total number of books and book chapters: 103
- Total number of journal articles: 1529

Summary of Collaborations Resulting from the Ecological Research Program (2000-2005)

- Total collaborations: 585
- Intramural: 276
- Extramural (STAR) 309
- Collaborators most frequented (10 or more collaborations in five years):
 1. U.S. Universities (372)
 2. State Resource Agencies (59)
 3. U.S. Geological Survey (46)
 4. Department of Agriculture (25)
 5. Department of Interior (18)

New Areas of Research

- Ecological Accountability
- Ecological Forecasting Tools for Population, Community and Ecosystem Assessment
- Ecological Forensics
- Mississippi River Basin
- Ecological Services
- Global Earth Observation System (GEOS)

Budget

- Ecological Research budget reduced in FY 05 & FY 06
 - Appears to have slowed after losses of >\$30M
 - Loss of STAR Program problematic
- Still the largest single ORD research program (\$80M and 300 FTEs)
 - Ecological Research Program is 21% of ORD's base
 - Ecological Research Program is 20% of ORD's FTEs
 - Largest Single Research Program in ORD
 - Home of Ecological "Core Research"
 - Re-evaluation of existing research areas (November 2005)
 - Identification of new research area
 - Revised MYP in spring of 2006

A photograph of a pond in a forest. The water is dark and reflects the surrounding trees and sky. The pond is covered with numerous green lily pads, some of which are beginning to turn yellow or brown. A large, weathered log lies horizontally across the middle of the pond. The background is a dense forest with many thin, bare tree trunks and branches, suggesting an autumn or winter setting. The overall atmosphere is quiet and natural.

Thank you