Drucker: The most valuable asset of a 21\textsuperscript{st} century institution will be its “\textbf{Knowledge Workers}” and their productivity.
Conservation In Transition...
The Enabling Role of Geospatial Technology and Its Application In 21st Century Conservation
Sustaining Our Nation’s Endemic Fish & Wildlife Resources

Objectives:

Set The Stage: Reminder Of Foundational Changes Occurring In Conservation

Provide Overview of FWS Progress: A “One-Service” Response Intended To Manage, Facilitate, And Lead Change
(To Help Clarify Seemingly Disparate “Serial” Priorities: SHC, LCCs, Refuge I&M, Surrogate Species, and [...LCD, At Risk etc...])

Open The Mike: A Group Karaoke On Key Roles YOU Can And Will Play To Unlock Or Gridlock 21st Century Conservation
Conservation In Transition...

Forces Changing Conservation

Changing Who We Are & What We Do
Why in 3 Slides

The Ecological Systems on Which Fish and Wildlife Depend Have and Are Continuing to Change…

Societies' Values on Which Fish and Wildlife Conservation Depend Have and Are Continuing to Change…
The Public Trust Doctrine

The Nation’s fish and wildlife resources are publicly owned and held in trust by the government for the continuing benefit of the public.

How Much?
How Much More?
Where?
Landscape Conservation Why in 3 Slides

Advancements in...

Conservation Theory
- Conservation Biology
- Landscape Ecology
- Ecosystem Management

Digital Revolution
- Geographic Information Systems
- Remote Sensing
- Information Management
- Remote Collaboration

Decision Theory
- Adaptive Management
- Structured Decision-making
- Bayesian Belief Networks
WE NEED TO
Rapid and Systems-level Changes

WE HAVE TO
Transparency & Accountability

Why?

The Public Trust Doctrine
The Nation’s fish and wildlife resources are publicly owned and held in trust by the government for the continuing benefit of the public.

How Much?
How Much More?
Where?

WE CAN
Advancements in Theory and Technology

Conservation Theory
- Conservation Biology
- Landscape Ecology
- Ecosystem Management

Digital Revolution
- Geographic Information Systems
- Remote Sensing
- Information Management
- Remote Collaboration

Decision Theory
- Adaptive Management
- Structured Decision-making
- Bayesian Belief Networks

Advancements in Theory and Technology
## Conservation In Transition…
### Operating Under A Conservation Target of Sustaining Our Nation’s Endemic Fish & Wildlife Resources

### An Operational Comparison

<table>
<thead>
<tr>
<th></th>
<th>Resource Management (Land Stewards)</th>
<th>Conservation Science (System Sustainability)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Planning</strong></td>
<td>• Activity oriented</td>
<td>• Outcome oriented</td>
</tr>
<tr>
<td></td>
<td>• Administratively focused</td>
<td>• Predictive</td>
</tr>
<tr>
<td></td>
<td>• Programmatically explicit</td>
<td>• Model based</td>
</tr>
<tr>
<td></td>
<td>• Opportunity based</td>
<td>• Spatially explicit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Multi-scaled</td>
</tr>
<tr>
<td><strong>Implementation</strong></td>
<td>• Protection, restoration, and management pursued as ends</td>
<td>• Protection, restoration, and management pursued as means</td>
</tr>
<tr>
<td></td>
<td>• Opportunities prioritized at the project scale</td>
<td>• Opportunities prioritized against landscape-scale bio assessments</td>
</tr>
<tr>
<td><strong>M&amp;E</strong></td>
<td>• An operational luxury</td>
<td>• Essential to assessing outcomes</td>
</tr>
<tr>
<td></td>
<td>• Appropriate as an element of research</td>
<td>• Integral to structured, adaptive decision making</td>
</tr>
<tr>
<td><strong>Research</strong></td>
<td>• Priorities are derived from periodic calls to programs and field stations to identify their needs</td>
<td>• Aimed at testing assumptions and uncertainties of biological planning and assessment</td>
</tr>
</tbody>
</table>
Strategic Habitat Conservation

– Release of Strategic Habitat Conservation July 2006

The FWS “One-Service” Response Intended To Manage, Facilitate, And Lead Change
Strategic Habitat Conservation
Strategic Habitat Conservation

– Release of Strategic Habitat Conservation July 2006

- **Conservation Target:** Landscapes that can sustain populations of fish and wildlife resources.
  - How Much, How Much More, and Where?

- **Science:** As a body of knowledge and as a method of discovery:
  - Learning Becomes an explicit objective of management.
Acknowledges Species are Drivers of Landscape-scale Conservation – Measures of System Sustainability
Strategic Habitat Conservation

- Release of Strategic Habitat Conservation July 2006

- **Conservation Target**: Landscapes that can sustain populations of fish and wildlife resources.
  - How Much, How Much More, and Where?

- **Science**: As a body of knowledge and as a method of discovery:
  - Learning Becomes an explicit objective of management.

- **Landscape**: Land management occurs at the site scale; yet ecological outcomes are system dependent, operating on processes manifested at broader spatial and temporal scales.
  - Addressing the Challenges of Scale

- **Interdependence**: Goals and objectives of functional landscapes to sustain fish and wildlife exceed the operational reach of individual programs, agencies, and organizations
  - Collaboration++
“My biggest worry is the ‘budget neutral’ constraint we heard earlier this year. You can't do this on the cheap and resistance will be huge if project leaders are told to take it on as an additional task as a home-grown, naturally evolving, cottage industry style of action with the implication being they should drop other things (very important things to them) or told to ‘work smarter not harder’. No successful retooling of industry or major ‘Manhattan Project-type government initiative’ ever got off the ground without new money - not a re-slicing of the pie.”
FWS Leadership Commits To Catalyzing Wall-to-Wall Collaborative Technical Capacity: Biological Planning, Conservation Design, Outcome-based Monitoring, and Assumption-driven Research In Support of Our Conservation Delivery Decision-making Enterprise

2008-2010 Continued Responses to the Challenges - A Way of Working Response -

Catalyzed International LCC Network NWRS Inventory and Monitoring
Aligning Our Business Management Systems To Support A One-Service SHC Approach

Jun 22 2011

United States Department of the Interior
FISH AND WILDLIFE SERVICE
Washington, D.C. 20240

In Reply Refer To:
ABHC/DTS 048640

JUN 2 2 2011

Memorandum

To: Service Directorate
From: Deputy Director
Subject: Building a New U.S. Fish and Wildlife Service Operational Plan Based on Biological Outcomes

Of our many conservation successes of the 20th Century, perhaps none surpasses the restoration of North American waterfowl. By the 1930’s, the cumulative effects of commercial harvest, habitat destruction, and persistent drought had reduced populations of many waterfowl species to small fractions of their historical abundances. Thankfully, the concerted efforts of conservation leaders, legislators, government agencies and private individuals led to new laws, policies, and programs that changed the way harvest regulation and habitat conservation were pursued. These changes brought about many of the features we now accept as vital components of our conservation toolbox: the Federal Duck Stamp, a National Wildlife Refuge System, annual waterfowl surveys, Flyway Councils, a strategic North American Waterfowl Management Plan, NAWCA, Joint Ventures and more. It is no coincidence that the 2009 State of the Birds Report found that waterfowl (and other wetland dependent birds) are the only major group of birds with upwards population trends.

But the achievements in waterfowl conservation weren’t due solely to more laws, more money, and more land. Along the way, we also learned the importance of working in partnerships, obtaining and applying the best science, and using a strategic landscape approach. Our challenge for the future is using what we’ve learned from past successes of our past and applying them to emerging challenges.

A few years ago, we described a new conservation approach for the Service. As detailed in the document Conservation in Transition: Leading Change in the 21st Century, we recognized that with the new challenges of the 21st century and recent advances in conservation science, as well as the drive for biological accountability, the Service needed to take a more strategic approach to sustaining fish and wildlife populations at landscape scales. In that document we committed to:

- A shift from managing individual resource components to sustaining species, populations, communities, and systems;
- An emphasis on science explicitly linking work at project scales to achievement on broader scales, including landscapes, major ecoregions, and entire species ranges;
- Increased use of predictive models and specific measurable biological outcomes;

- Increased emphasis on biological accountability and inter-organizational collaboration;
- Increased emphasis on transparency, public participation and engagement.

We now need to solidify new organizational processes to secure an enduring change in how the Service manages its resource conservation enterprise--beginning with a complete revitalization of the Operational Plan (Ops Plan) based on biological outcomes at the landscape level.

To that end, I recently asked Kathy Tynan and Seth Mott to bring together a team of Service leaders to begin helping us re-tool the Ops Plan to support decision-making based on biological outcomes at the landscape level. It is my intention that this team will serve both as architects of the proposed framework and overarching Steering Committee that will leverage our scientific and technical teams as needed in future implementation. I also want to ensure that our employees have a voice in this process, so I have asked the team to build this into their approach. Their first effort is to develop an operational framework that supports biological outcomes at the landscape level for presentation at the August Directorate Meeting.

It is my hope that tomorrow’s Ops Plan will provide the framework to support:

- **Alignment & Collaboration:** to enable Service programs, staff and external partners to work together with a common understanding of priorities, roles, responsibilities and intended results.

- **Investment Decisions:** to make well-reasoned, transparent investment choices based upon Administration and stakeholder priorities and upon the Service’s distinctive capacity to address them.

- **Stakeholder Support:** to demonstrate to internal and external stakeholders, Department of the Interior, Office of Management and Budget and Congress the alignment of program resource requirements with Service requirements, and with Administration and stakeholder priorities.

- **Performance Management:** to monitor and evaluate agency performance (i.e., effectiveness, efficiency and quality of efforts to achieve biological outcomes), ensure accountability for results, and adjust conservation strategies accordingly.

I will look to the Directorate to lead this effort as part of this final step in transforming our conservation approach. Thank you for making team members (list attached) available for their first meeting. I also ask for your support and cooperation in accommodating upcoming meetings to complete their work prior to the August Directorate meeting.

Attachment – Biological Outcomes Ops Plan Team
Increase Transparency and Science-driven Strategic Conservation Investments Agency-wide: HQ, RO, Field Stations.

- Define Common Biological Objectives at Landscape Scales
- Translate Into Landscape and Habitat Objectives
- Connect, Align, and Target our Resource Decision-making Practices and Systems
- Measure Progress and Success (Accountability)
  - Conservation Actions
  - Biological Outcomes
Public Has Entrusted Thousands of Species To FWS.
(Public Has Entrusted Even More Species to State Fish and Wildlife Agencies)

Fish and wildlife agencies have a finite set of resources (human and financial capital) to carry-out their public trust mandates – insufficient to address all requirements (and certainly not addressed equally).

Only a subset of trust responsibilities get attention; hence, Public Trust responsibilities must be prioritized and work aligned along those priorities.
Priority vs. Surrogate Species
- Concepts -

**Priority Species**
- Emphasize a subset based on any number of criteria
- Implies relative rank/importance
- Exclusionary approach
- 1:1 species benefits
- Any broader benefits implied/assumed

**Surrogate Species**
- Emphasize as many species as possible
- Not intended to imply relative rank/importance
- Inclusionary approach
- 1:many/many:many intended species benefits
- Broader species benefits explicitly stated, evaluated
Strategic Habitat Conservation

- Release of Strategic Habitat Conservation July 2006
- Series of workshops in the region Fall of 2012
WHO IS YOUR SURROGATE BABY?

I AM MY OWN SURROGATE SPP!

PICK ME AS YOUR SURROGATE

I ATE YOUR SURROGATE SPECIES. PROTECT ME?
Application of The Surrogate Species Approach

- Define Common Biological Objectives In The Context of System Sustainability
- Translate Into Landscape and Habitat Objectives
- Align and Target our Actions to Achieve Objectives
- Measure Progress and Success:
  - Conservation Actions
  - Biological Outcomes
Species Conservation at Landscape Scales

Biological Planning
Consistently identifying common biological outcomes at landscape scales using surrogate species approach, and species of conservation interest; setting population objectives.
- Surrogate Species
- Species of Conservation Interest (Outside of Surrogate Landscape)
- Other Service Priorities

Conservation Design - Setting Landscape Objectives
Landscape conservation design includes identifying those factors limiting our species conservation targets from achieving their population objectives, and helps us establish landscape objectives that describe where, how much conservation is needed.
Under Construction

Conservation Delivery - Landscape Annual Work Planning
Demonstrates the Service’s cross-program alignment around common biological outcomes at landscape scales, and enables us to work in concert with partners towards a shared understanding of landscape-scale priorities, roles, responsibilities, work activities, and intended results.
Under Construction

Conservation Accountability
Allows the Service to measure our conservation success, in terms of both species outcomes, and the effectiveness of our conservation actions, and adapt over time.
Under Construction

Conservation Investment Strategy - Tying Resource Allocations to Landscape Biological Outcomes
Enables the Service to make well-reasoned, transparent conservation investment decisions based on common biological outcomes at landscape-scales and in consideration of the Service’s unique capacity to address them.
Under Construction
<table>
<thead>
<tr>
<th>Planning</th>
<th>Resource Management (Land Stewards)</th>
<th>Conservation Science (System Sustainability)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity oriented</td>
<td>• Activity oriented</td>
<td>• Outcome oriented</td>
</tr>
<tr>
<td>Administratively focused</td>
<td>• Administratively focused</td>
<td>• Predictive</td>
</tr>
<tr>
<td>Programmatically explicit</td>
<td>• Programmatically explicit</td>
<td>• Model based</td>
</tr>
<tr>
<td>Opportunity based</td>
<td>• Opportunity based</td>
<td>• Spatially explicit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Multi-scaled</td>
</tr>
<tr>
<td>Implementation</td>
<td>• Protection, restoration, and</td>
<td>• Protection, restoration, and management</td>
</tr>
<tr>
<td></td>
<td>management pursued as ends</td>
<td>pursued as means</td>
</tr>
<tr>
<td></td>
<td>• Opportunities prioritized at the</td>
<td>• Opportunities prioritized against</td>
</tr>
<tr>
<td></td>
<td>project scale</td>
<td>landscape-scale bio assessments</td>
</tr>
<tr>
<td>M&amp;E</td>
<td>• An operational luxury</td>
<td>• Essential to assessing outcomes</td>
</tr>
<tr>
<td></td>
<td>• Appropriate as an element of</td>
<td>• Integral to structured, adaptive</td>
</tr>
<tr>
<td></td>
<td>research</td>
<td>decision making</td>
</tr>
<tr>
<td>Research</td>
<td>• Priorities are derived from</td>
<td>• Aimed at testing assumptions and</td>
</tr>
<tr>
<td></td>
<td>periodic calls to programs and</td>
<td>uncertainties of biological</td>
</tr>
<tr>
<td></td>
<td>field stations to identify their</td>
<td>planning and assessment</td>
</tr>
<tr>
<td></td>
<td>needs</td>
<td></td>
</tr>
</tbody>
</table>
Conservation In Transition...
Operating Under A Conservation Target of Sustaining Our Nation’s Endemic Fish & Wildlife Resources

The 21st Century wildlife agency will need…

• A capacity for conservation that extends beyond the operational footprint of its programs – the capacity to characterize, assess, and predict population and habitat sustainability across scales

• New organizational core competencies in landscape assessment

• An approach to partnering that enables a region’s private, state, federal conservation infrastructure to operate as a networked, leveraged system

• To assume a role in the Public Square that extends beyond the operational footprint of its programs
  
  ➢ Make available transparent, science-based assessments of population and habitat sustainability

  ➢ Engage the citizenry in the search for socially viable solutions
The 21st Century Workforce Is…

Educated and trained in systems thinking

Socially conditioned to networking

“Knowledge workers” are

uncomfortable in hierarchical command and control organizational structures

more comfortable AND productive when empowered to work in a horizontally integrated capacity

Choose WHERE they want to use their knowledge!
Geospatial Science – A Key To Unlocking OR Gridlocking 21\textsuperscript{st} Century Conservation

What are YOU doing to: Unlock? Gridlock?

Barriers of Organizational Structures (silos)
- Operate as a “System” – National and Regional and across Functions/Expertise
- Knowledge Accessibility – To Data? To You? To Your Communities?
- Interoperability Potential? Integration Potential?
- Busting the Barriers of Scale: Organizationally, Spatially, and Temporally

Barriers of Science Integrity and “One-Service” Spatial Continuity (>QA/QC)
- Tools and Digital Data Proliferation (Do we really need another DST, webportal, etc)?
- Are We Innovating From Existing Standards?
- Is our Workforce Disciplined In Data Management (its everyone’s job)
- Are we Documenting Assumptions and Uncertainties? Are they being tested?
- Interoperability Potential? Integration Potential?

Barriers of Geospatial Illiteracy
- What does our Organization’s Core Competencies need to encompass?
- What Basic Understanding is Needed by Leadership?
- What are the Opportunity Cost With Pacing Geospatial Innovation?