North American Marine Protected Areas Network

Taking Stock of Our Common Seascape—A Pilot Project

Gary E. Davis
GEDavis & Associates
Westlake Village, CA
Four Pillars of Place-based Stewardship

- KNOW & understand resource conditions
- RESTORE impaired ecosystems & redesign for the future
- PROTECT ecosystem integrity & mitigate threats
- CONNECT people to nature
Conservation Is Like Health Care for the Environment and Ecosystems
William Harvey in 1628 showed that the heart was a pump and that its function was to pump blood to the body through a series of circles—the circulatory system.
The Land/Sea Ethic

“A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise.”

Aldo Leopold, 1949
A Sand County Almanac
Ecosystem Integrity

A ‘Healthy’ Ecosystem...

- Has all its parts, no missing species
- Has no extra parts, alien species
- Responds to stress without collapse
- Is resilient, e.g., resists alien invasions
- Possesses capacity for self-renewal
Vital Signs Monitoring
Cornerstone of Stewardship

- Know resource conditions
- Understand how resources interact
- Predict ecosystem behavior
- Project consequences of intervention or lack of action
- Provides stories that connect people to nature (case studies)
Shared Monitoring Program Goals

NAMPAN-B₂B

- Provide information for MPA site managers to improve stewardship
- Connect people to nature—ocean ethic
- Explore the efficacy of continental-scale strategies to improve conservation
Objectives
The NAMPAN-B2B Shared Monitoring Program Will:

Measure, assess, and report species (biodiversity), spaces (habitats and abiotic processes) and threats (stressors) of MPAs across B2B.
Specific Objectives

(Attributes of a Successful Program)

- Assess status & trends of iconic species
- Evaluate habitat & community dynamics
- Assess environmental threats
- Map changes in species distributions
- Identify trophic cascades
- Evaluate public awareness of MPAs and marine resources
- Evaluate corporate investments near MPAs
Objectives (continued)

- Communicate results in a timely and effective manner
- Harmonize & improve network cooperation
- Contribute to adaptive management
- Assess MPA network responses to human actions
- Ensure sustainable monitoring programs
- Determine MPA system effectiveness
Shared Monitoring Program Values

- Cost-effective approach to conservation
- Facilitates harmonized & consistent management policies and tools—improved communication
- Context for understanding environmental changes (State of NAFTA)
  - Multi-cultural education and ocean ethic
Bio-physical Indicators

- Eel grass beds
- Kelp forests
- Black oystercatcher
- Invasive species
- Sea otters
- Rocky shores
- Seabirds & sea-ducks
- Whales
- Water quality
- Rockfish
Socio-economic Indicators

- Cultural
- Economic standard suite
- Human development
- Knowledge and awareness
- Local marine use patterns
Governance Indicators

- Effective compliance
- Stakeholder agreements
- Effective zoning
- Local MPA investment
- Civic engagement
- Conflict resolutions
- New conflicts

- Issues resolved or reduced
- Percent bioregion in MPA
- Management perceptions
- Stakeholder engagement
- Stakeholders feel valued
- Science-based decisions
- Goals & objectives met
NAMPAN Strategy

- Focus on special places already protected
- Provide continent-wide ecological context
  - Marine ecoregions
  - Marine priority conservation areas
- Use existing information to assess MPA health—temporary surrogate for monitoring
- Demonstrate value of evidence and science-based assessments
Taking Stock of Our Common Seascape

- Why use ecological scorecards for MPAs?
  - Common ground among cultures
  - Understand nature to improve conservation
  - Communication among societal sectors
  - Civic engagement

- Site-level monitoring is rare
- Site managers & system administrators need better communication tools
Bering to Baja (B2B) Pilot Project

- Ten MPAs
- Expert panels
- Standard questions
  - Water
  - Habitat
  - Living Resources
- Condition & Trend
- Evidence-based, consensus judgments on MPA health
Pilot MPAs

1. Pacific Rim National Park
2. XWAYEN Race Rocks Ecological Reserve and MPA
3. South Slough NERR
4. California Channel Islands
5. Tijuana River NERR & Refuge
6. Isla Guadalupe Biosphere Reserve
7. El Vizcaíno Biosphere Reserve
8. Bahia de Loreto National Park
9. San Pedro Martir Island Biosphere Reserve
10. Alto Golfo de California y Delta del Rio Colorado Biosphere Reserve
The Science & Art of Environmental Scorecards

Healthy Environment & Sustainable Society

Public & Political World Goals

Science & Technical World

Evaluate, diagnose & prognosticate (condition and trend of water, habitat, & living resources)

Synthesize & Interpret (NAMPAN 14 questions)

Describe & Assess System (statistics & scientific journal articles)

Observe & Measure (data acquisition & technical reports)

Design Experiments & Monitoring Protocols (decide what and how to measure)

Professional Judgment

Technical Computation
U. S. Pilot Sites

- Channel Islands, California
  - California State Marine Reserves
  - National Marine Sanctuary
  - National Park
- South Slough, Oregon
  - Oregon Department of State Lands
  - National Estuarine Research Reserve
- Tijuana River, California
  - State Park
  - National Estuarine Research Reserve
  - National Wildlife Refuge
Tijuana River, California

Size: 1,012 ha

Ecoregion: Southern Californian Pacific—PCA 18

Habitats: beach, dune, mudflat, salt marsh, riparian, coastal sage, and uplands
Oneonta Slough Ecological Restoration
Tijuana River Issues

- Urban development in watershed
- U.S.—Mexico border traffic and fence
- Health threats from contaminated water
- Fragmented habitats and wildlife populations
- Relative biodiversity high—last best place to experience coastal habitats in ecoregion
Tijuana River Scorecard Outcome I

- **Water Stressors**
  - Poor, improving ↑
- **Water Nutrients**
  - Fair, stable ↔
- **Water Human Health**
  - Critical, improving ↑
- **Water Human Activity**
  - Poor, improving ↑

- **Habitat Extent**
  - Poor, improving ↑
- **Habitat Contaminants**
  - Fair, declining ↓
- **Habitat Human Activity**
  - Poor, stable ↔
- **Biodiversity**
  - Good, stable ↔
Tijuana River
Scorecard Outcome II

- Extracted Species
  - N/A not allowed
- Alien Species
  - Fair, improving ↑
- Keystone Species
  - Fair, improving ↑
- Focal Species
  - Poor, improving ↑

- CEC Species of Common Concern
  - N/A none occur at site
- Living Resources & Human Activities
  - Fair, improving ↑
Tijuana River Summary

- Water:
  - Critical—Fair
  - Improving

- Habitat:
  - Poor—Fair
  - Stable

- Living resources:
  - Poor—Good
  - Improving
Channel Islands, California

Size: 430,000 ha

Ecoregions: Southern California Pacific & Montereyan Pacific Transition—PCA 17

Habitats: kelp forests, sea grass beds, rock reefs, rocky submarine canyons, pelagic waters, ocean upwelling zones, mud, sand and boulder benthos, deep basins (1,500 m), coastal marshes and lagoons, sand beaches, sea cliffs, and rocky intertidal benches.
Channel Islands Issues

- Unsustainable fishing
- Legacy contamination by DDT & PCBs
- Habitat fragmentation
- Air pollution
- Human disturbance—shipping, oil & gas development, visitors to rookeries
- Marine reserve network
Channel Islands
Scorecard Outcome I

- Water Stressors
  - Good, ? no trend known

- Water Nutrients
  - Superior, stable ↔

- Water Human Health
  - Good, stable ↔

- Water Human Activity
  - Superior, stable ↔

- Habitat Extent
  - Fair, ? no trend known

- Habitat Contaminants
  - Good, improving ↑

- Habitat Human Activity
  - Fair, improving ↑

- Biodiversity
  - Fair, ? no trend known
Channel Islands
Scorecard Outcome II

- Extracted Species
  - Poor, improving ↑

- Alien Species
  - Superior, declining ↓

- Keystone Species
  - Fair, stable ↔

- Focal Species
  - Superior, improving ↑

- CEC Species of Common Concern
  - Good, improving ↑

- Living Resources & Human Activities
  - Fair, stable ↔
Channel Islands Summary

- **Water:**
  - Good—Superior
  - Stable

- **Habitat:**
  - Fair—Good
  - Improving

- **Living resources:**
  - Poor—Superior
  - Improving
South Slough, Oregon

Size: 1,931 ha

Ecoregion: Columbian Pacific—PCA 15

Habitats: upland forests, freshwater wetlands and ponds, salt marshes, tide flats, eelgrass meadows and open water estuarine habitats
The South Slough Reserve flows into Coos Bay
Fog-dependent coniferous forest characterizes reserve uplands
Coos Bay, Oregon
largest oyster-growing area in Oregon
South Slough Issues

- Watershed alterations, freshwater diversion
- Oyster culture
- Effluent from seafood processing facilities
- Invasive alien species, ~60 species in aquatic system
South Slough
Scorecard Outcome I

- Water Stressors
  - Good, stable ↔

- Water Nutrients
  - Good, stable ↔

- Water Human Health
  - Good, stable ↔

- Water Human Activity
  - Good, declining ↓

- Habitat Extent
  - Fair, improving ↑

- Habitat Contaminants
  - Good, ? No trend known

- Habitat Human Activity
  - Fair, stable ↔

- Biodiversity
  - Fair, stable ↔
South Slough
Scorecard Outcome II

- Extracted Species
  - Good, stable ↔

- Alien Species
  - Poor, declining rapidly ↓↓

- Keystone Species
  - Good, stable ↔

- Focal Species
  - Fair, improving ↑

- CEC Species of Common Concern
  - N/A none occur at site (sea otters extirpated)

- Living Resources & Human Activities
  - Fair, stable ↔
South Slough Summary

- **Water:**
  - Good
  - Stable

- **Habitat:**
  - Fair — Good
  - Stable ?

- **Living resources:**
  - Poor — Good
  - Stable
### Summary of U. S. Pilot MPA Scorecards

<table>
<thead>
<tr>
<th>Q #</th>
<th>Resource Category</th>
<th>Tijuana River</th>
<th>Channel Islands</th>
<th>South Slough</th>
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<tr>
<td>1</td>
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<td>Good ♦♦♦♦</td>
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<tr>
<td>4</td>
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<td>Fair ♦♦♦</td>
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<td>⇄</td>
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<td>7</td>
<td>Habitat activity</td>
<td>Poor ♦♦</td>
<td>Fair ♦♦♦</td>
<td>⇄</td>
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<tr>
<td>8</td>
<td>Biodiversity</td>
<td><strong>Good ♦♦♦♦♦</strong></td>
<td><strong>Fair ♦♦♦♦</strong></td>
<td><strong>Fair ♦♦♦</strong></td>
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<td><strong>Poor ♦♦♦</strong></td>
<td><strong>↑</strong></td>
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<td>10</td>
<td>Alien sp.</td>
<td><strong>Fair ♦♦♦♦</strong></td>
<td><strong>↑</strong></td>
<td><strong>Super♦♦♦♦♦♦♦♦♦</strong></td>
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<tr>
<td>11</td>
<td>Keystone</td>
<td><strong>Fair ♦♦♦♦</strong></td>
<td><strong>↑</strong></td>
<td><strong>Fair ♦♦♦♦</strong></td>
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<td><strong>↑</strong></td>
<td><strong>Super♦♦♦♦♦♦♦♦♦</strong></td>
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<td><strong>↑</strong></td>
<td><strong>Fair ♦♦♦♦</strong></td>
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Future Challenges

- Establish standard NAMPAN scorecard protocol
- Expand MPA scorecard assessments NAMPAN-wide
- Compare MPAs with other sites
  - Ocean observing systems
- Plan for long-term implementation