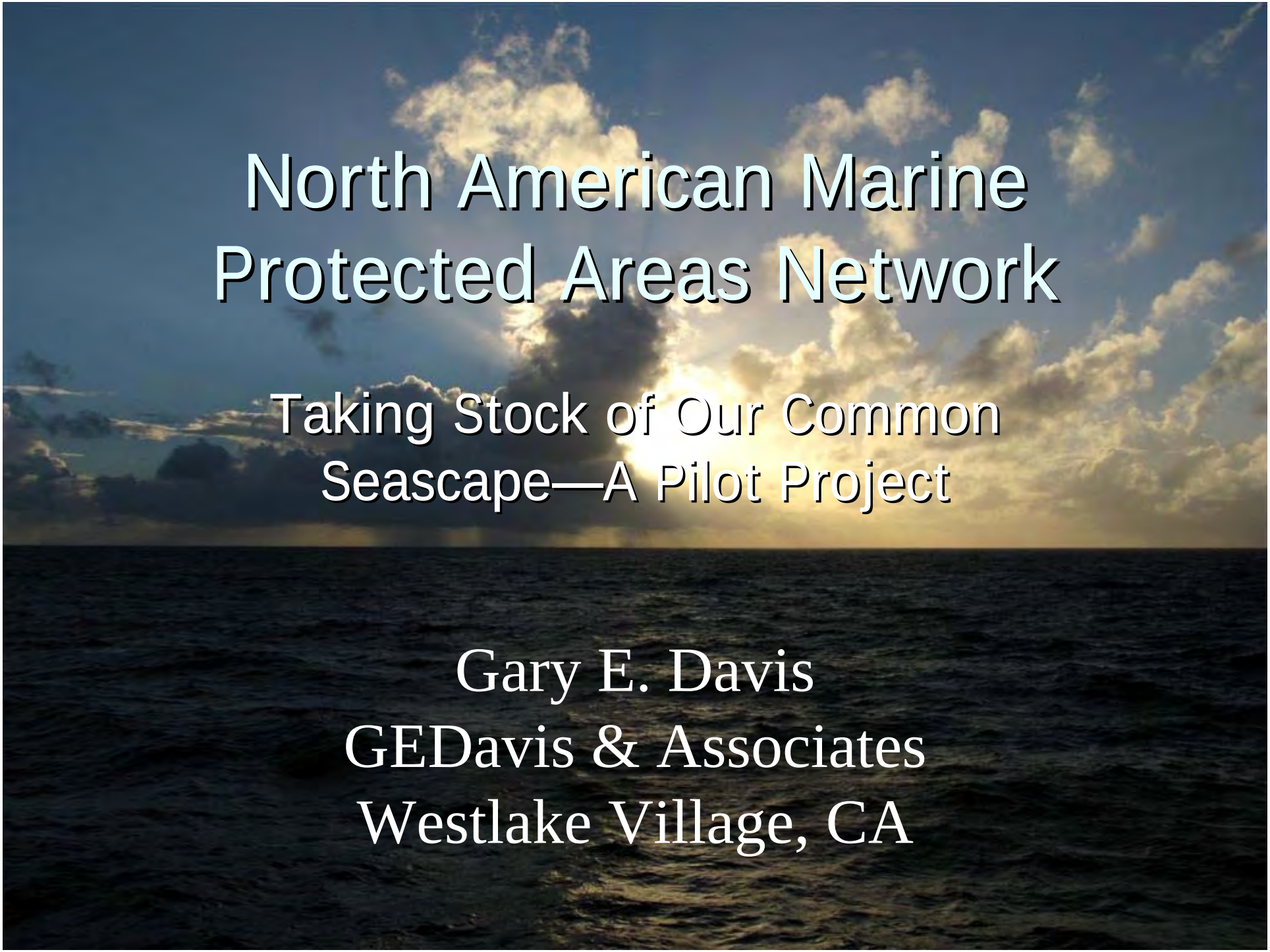


North American Marine Protected Areas Network

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

Ecological Vital Signs

Conservation Is Like Health Care for the Environment and Ecosystems

Ecology Is Still In The 17th Century Relative To Medicine

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

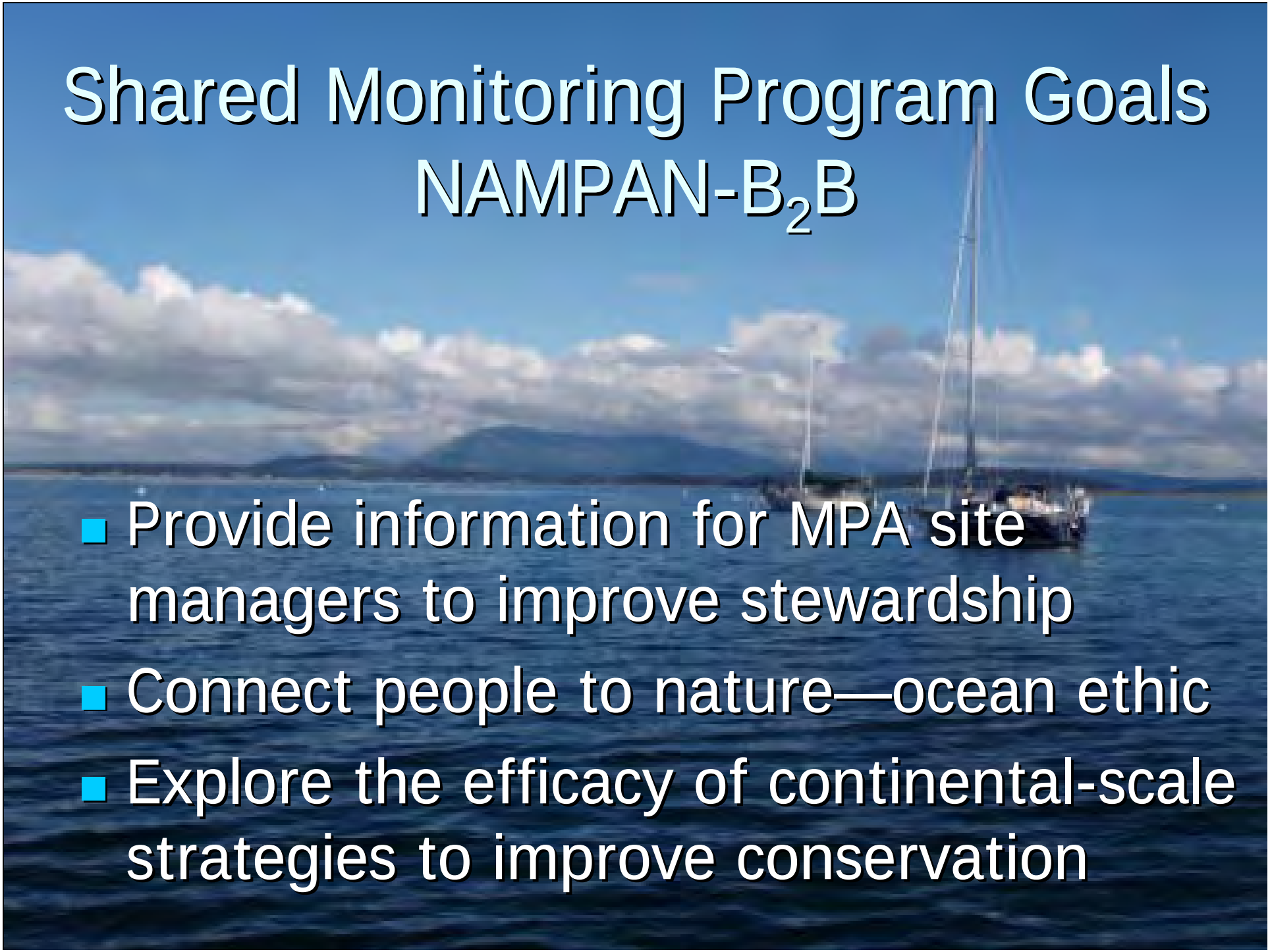
A ‘Healthy’ Ecosystem…

- 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

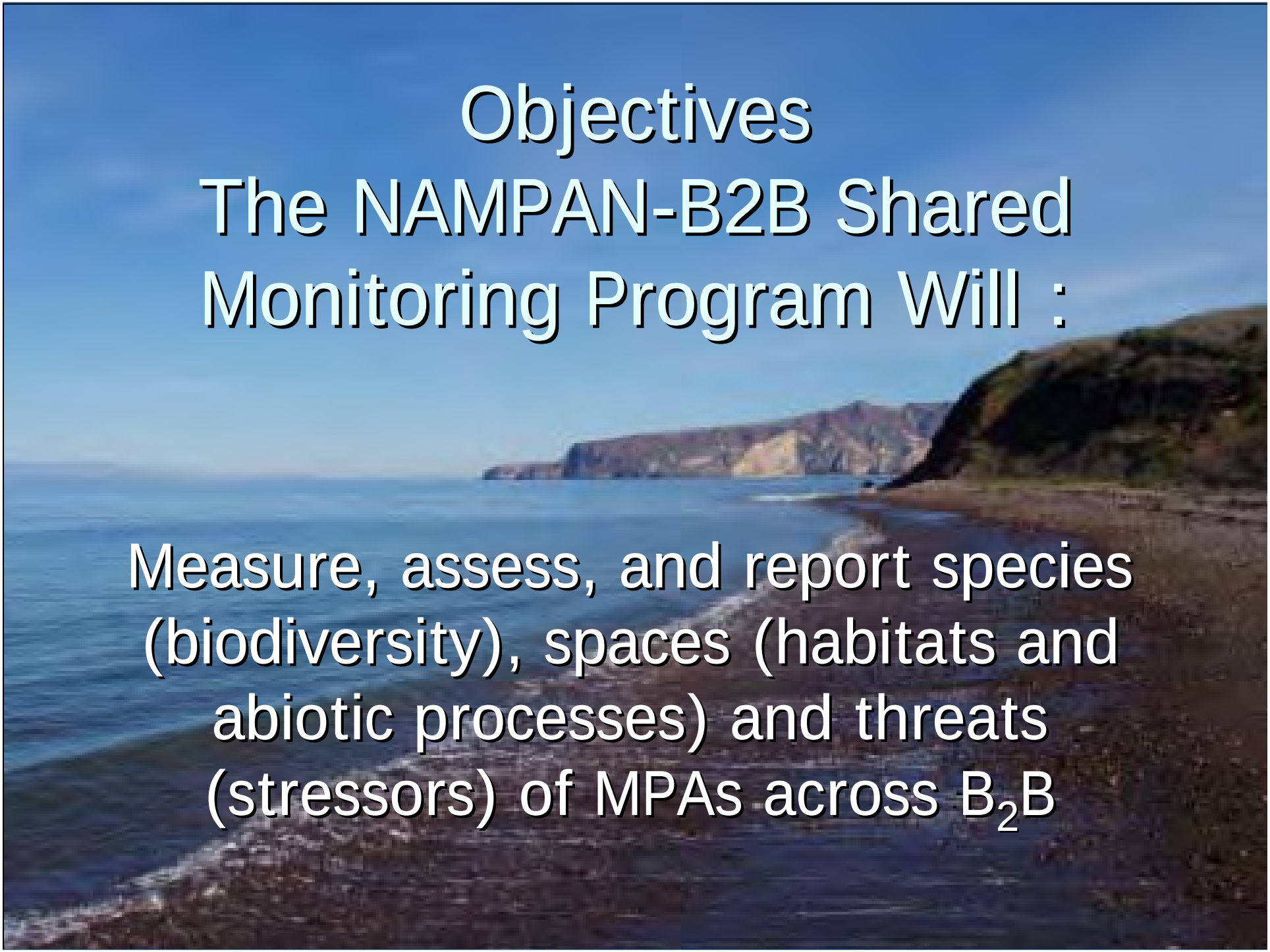
Vital Signs Monitoring Cornerstone of Stewardship

- 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-B_2B



- 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 B_2B

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)

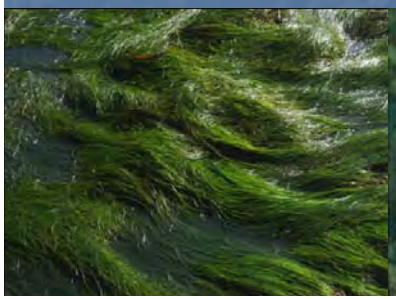
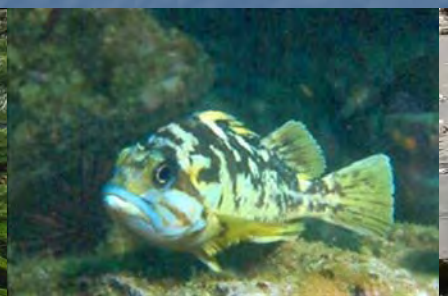
- Communicate results in a timely and effective manner
- Harmonize & improve network cooperation
- Contribute to adaptive management
- Assess MPA network responses to human actions
- Ensure sustainable monitoring programs
- Determine MPA system effectiveness

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

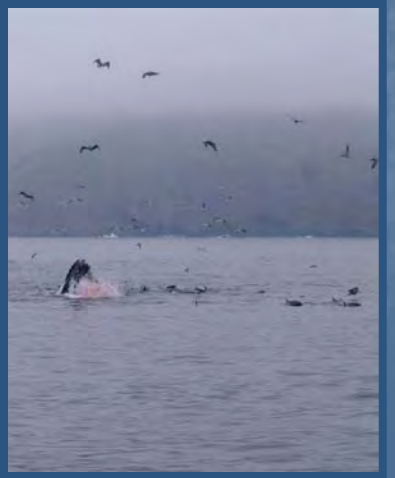
- Focus on special places already protected
- Provide continent-wide ecological context
  - Marine ecoregions
  - Marine priority conservation areas
- Use existing information to assess MPA health—temporary surrogate for monitoring
- Demonstrate value of evidence and science-based assessments

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

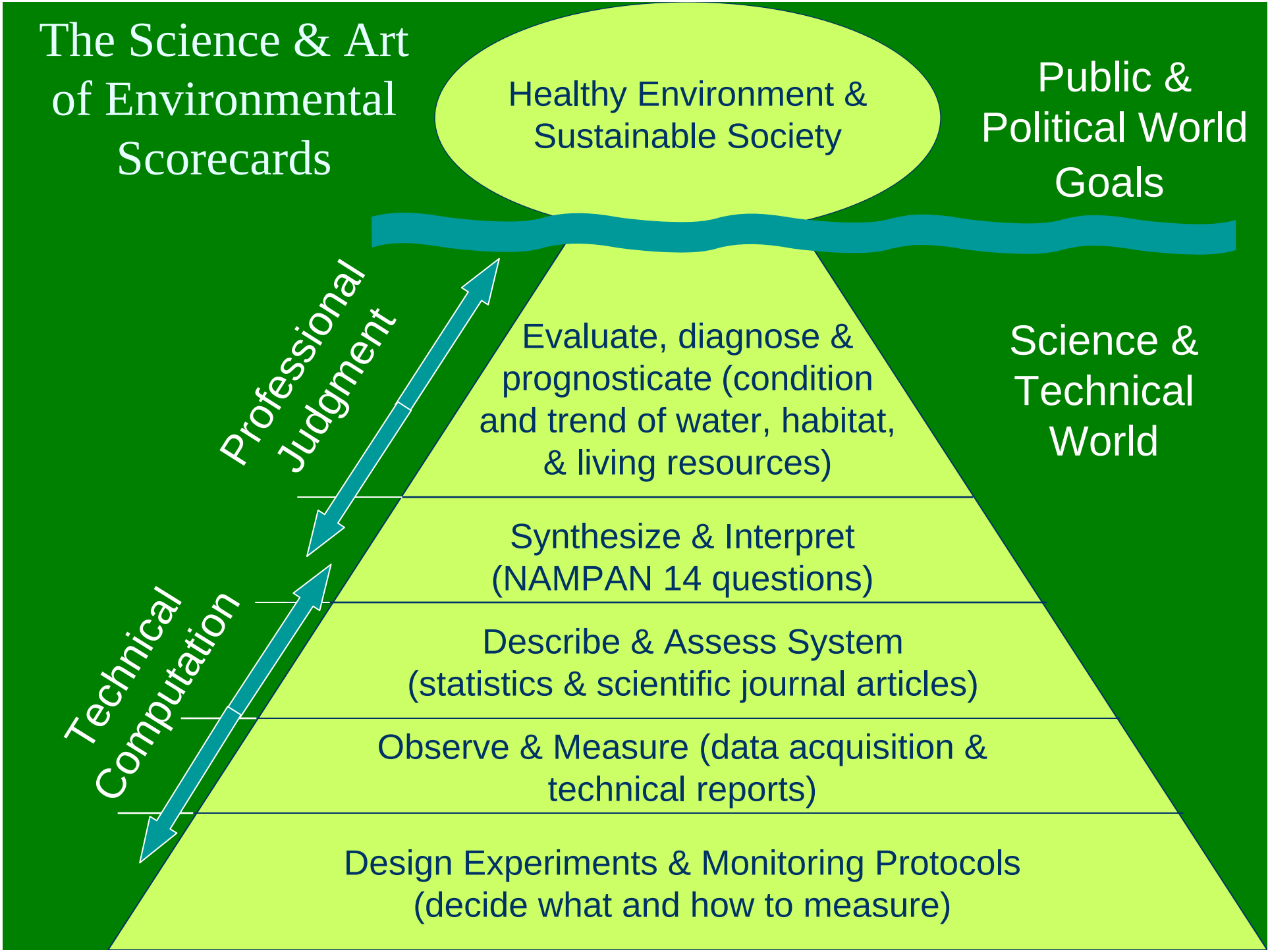
Bering to Baja (B2B) Pilot Project

- 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 Vizcaino 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
Professional Judgment
Technical Computation
Evaluate, diagnose & prognosticate (condition and trend of water, habitat, & living resources)
Science & Technical World
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)

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


DANGER
CONTAMINATED WATER
AVOID WATER CONTACT
FROM THIS POINT SOUTH
TO THE
INTERNATIONAL BORDER
PELIGRO
AGUA CONTAMINADA
/ALEJESE
EVITE CONTACTO
CONEL AGUA HASTA
LA LINEA INTERNACIONAL
COUNTY OF SAN DIEGO DEPT. OF ENVIRONMENTAL HEALTH
(619)338-2073

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 ↑

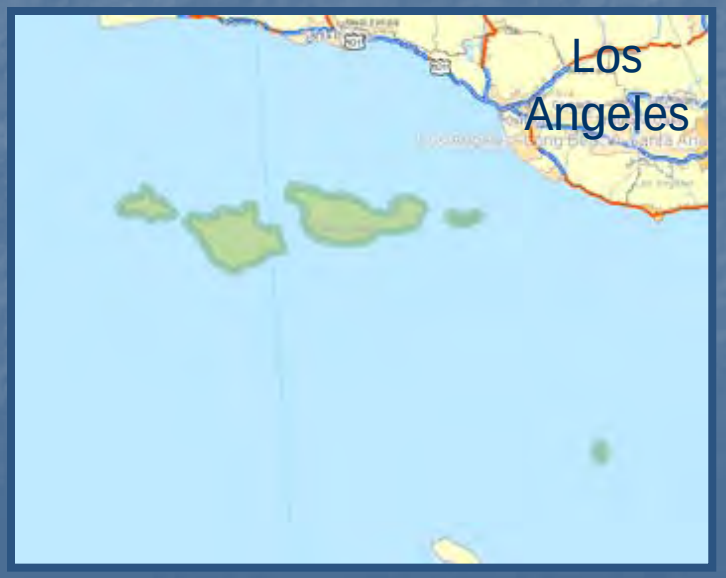
Tijuana River Summary

- Water:
  - Critical—Fair
  - Improving
- Habitat:
  - Poor—Fair
  - Stable
- Living resources:
  - Poor—Good
  - Improving

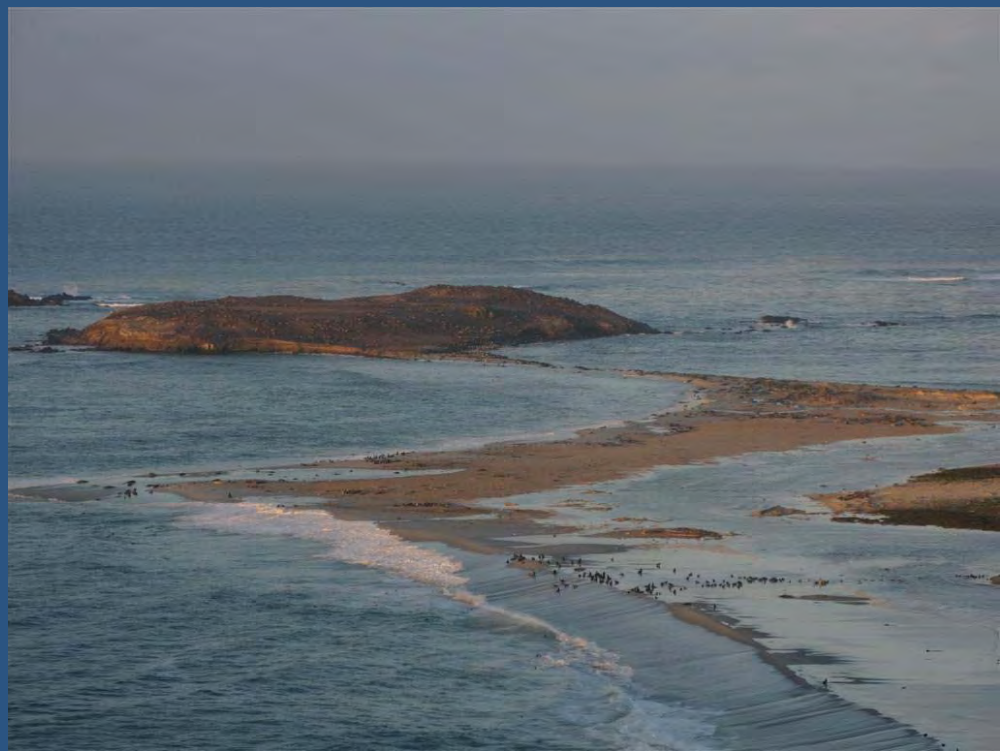
Channel Islands, California

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.




ANACAPA ISLAND

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

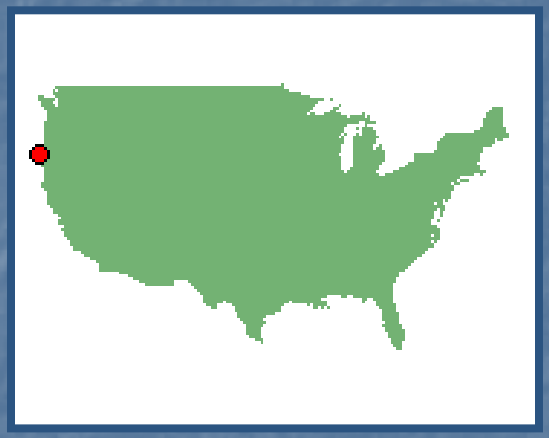
- Water:
  - Good—Superior
  - Stable
- Habitat:
  - Fair—Good
  - Improving
- Living resources:
  - Poor—Superior
  - Improving

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




South Slough
National Estuarine
Research Reserve
VISITOR'S CENTER &
ESTUARY STUDY TRAIL
National Estuarine Research Reserve Association
State of Oregon Division of State Lands
National Oceanic and Atmospheric Administration

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

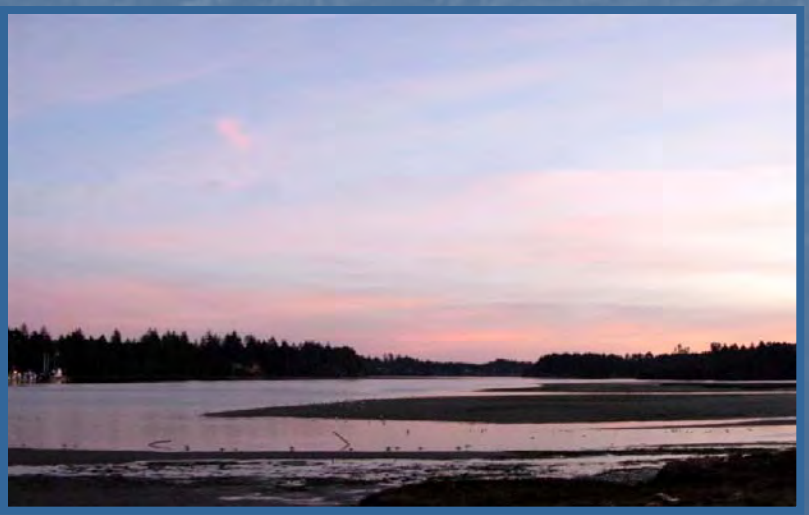
- Water Stressors
  - Good, stable ↔
- Water Nutrients
  - Good, stable ↔
- Water Human Health
  - Good, stable ↔
- Water Human Activity
  - Good, declining ↓
- Habitat Extent
  - Fair, improving ↑
- Habitat Contaminants
  - Good, ? No trend known
- Habitat Human Activity
  - Fair, stable ↔
- Biodiversity
  - 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

Q #	Resource Category	Tijuana River		Channel Islands		South Slough	
1	Water stressor	Poor ♦♦	↑	Good ♦♦♦♦	?	Good ♦♦♦♦	↔
2	Water nutrient	Fair ♦♦♦	↔	Super♦♦♦♦♦	↔	Good ♦♦♦♦	↔
3	Water health	Critical ♦	↑	Good♦♦♦♦	↔	Good ♦♦♦♦	↔
4	Water activity	Poor ♦♦	↑	Super♦♦♦♦♦	↔	Good ♦♦♦♦	↓
5	Habitat extent	Poor♦♦	↑	Fair ♦♦♦	?	Fair ♦♦♦	↑
6	Contaminants	Fair ♦♦♦	↓	Good♦♦♦♦	↑	Good ♦♦♦♦	?
7	Habitat activity	Poor ♦♦	↔	Fair ♦♦♦	↑	Fair ♦♦♦	↔

Summary of U. S. Pilot MPA Scorecards

Q #	Resource Category	Tijuana River		Channel Islands		South Slough	
8	Biodiversity	Good ♦♦♦♦	↔	Fair ♦♦♦	?	Fair ♦♦♦	↔
9	Extracted	N/A		Poor ♦♦	↑	Good ♦♦♦♦	↔
10	Alien sp.	Fair ♦♦♦	↑	Super♦♦♦♦♦	↓	Poor♦♦	↓↓
11	Keystone	Fair ♦♦♦	↑	Fair ♦♦♦	↔	Good ♦♦♦♦	↔
12	Focal sp.	Poor ♦♦	↑	Super♦♦♦♦♦	↑	Fair ♦♦♦	↑
13	CEC sp.	N/A		Good♦♦♦♦	↑	N/A	
14	Human act.	Fair ♦♦♦	↑	Fair ♦♦♦	↔	Fair ♦♦♦	↔

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