ST. PAUL WATERWAY
WA

DAVE MCENTEE, SIMPSON LUMBER COMPANY

St. Paul Waterway Site Overview

St. Paul Waterway and Kraft Mill

Objectives of Remediation

- Meet community objectives
- Reduce surface sediment toxicity to benthos (phenolics, PAHs, and copper)
- Early emphasis on source control
- Cleanup integrated with redevelopment consistent with water dependent uses of Kraft Mill
- Concurrent NRD restoration
- Adaptive management
- Regulatory closure (Superfund and NRD)

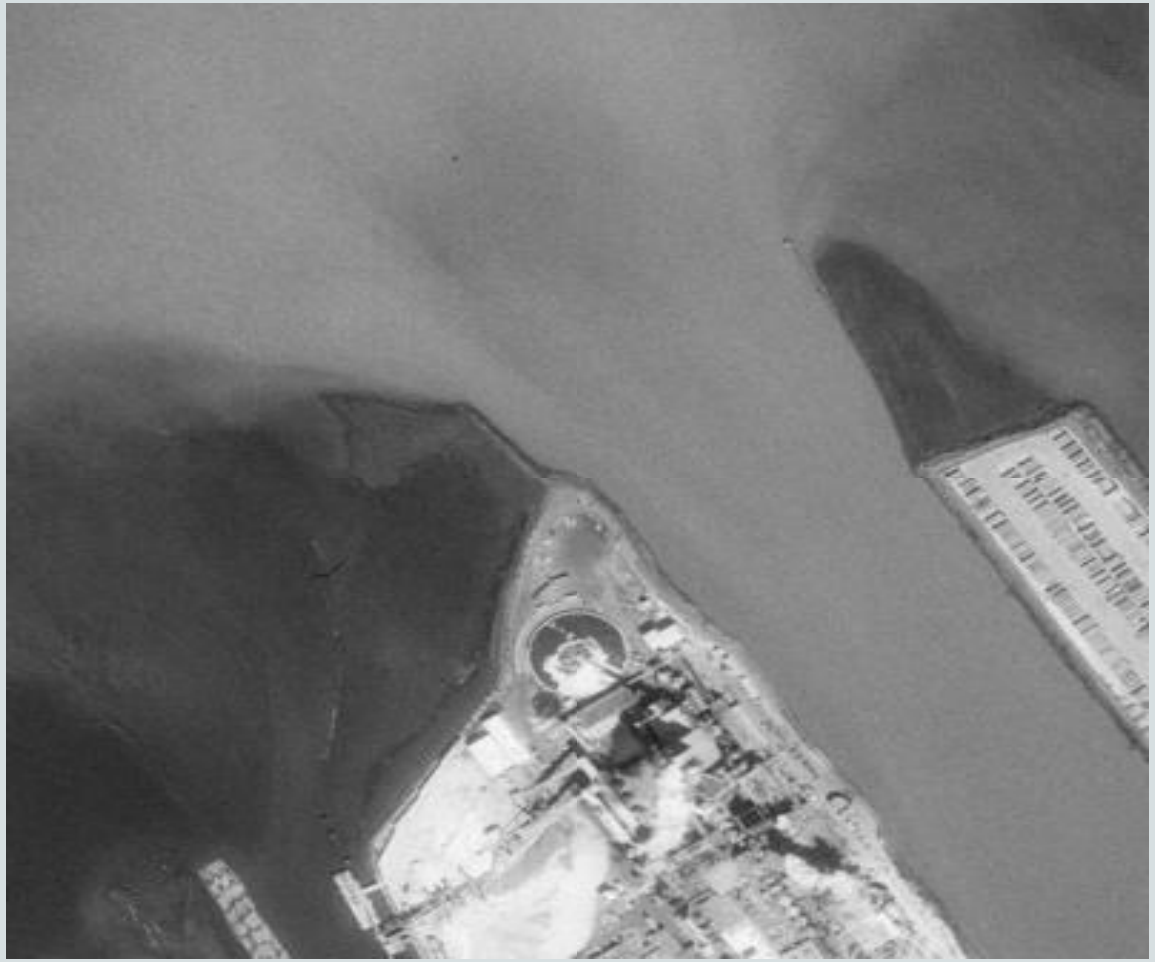
Project Collaboration

- WA State Dept. of Ecology
- WA State Dept. of Natural Resources
- USACE
- Audubon Society
- Sierra Club
- Washington Environmental Council
- Puyallup Tribe
- City of Tacoma
- USEPA Region 10
- NOAA
- Champion International (now International Paper)
- Citizens

Summary of Remedy

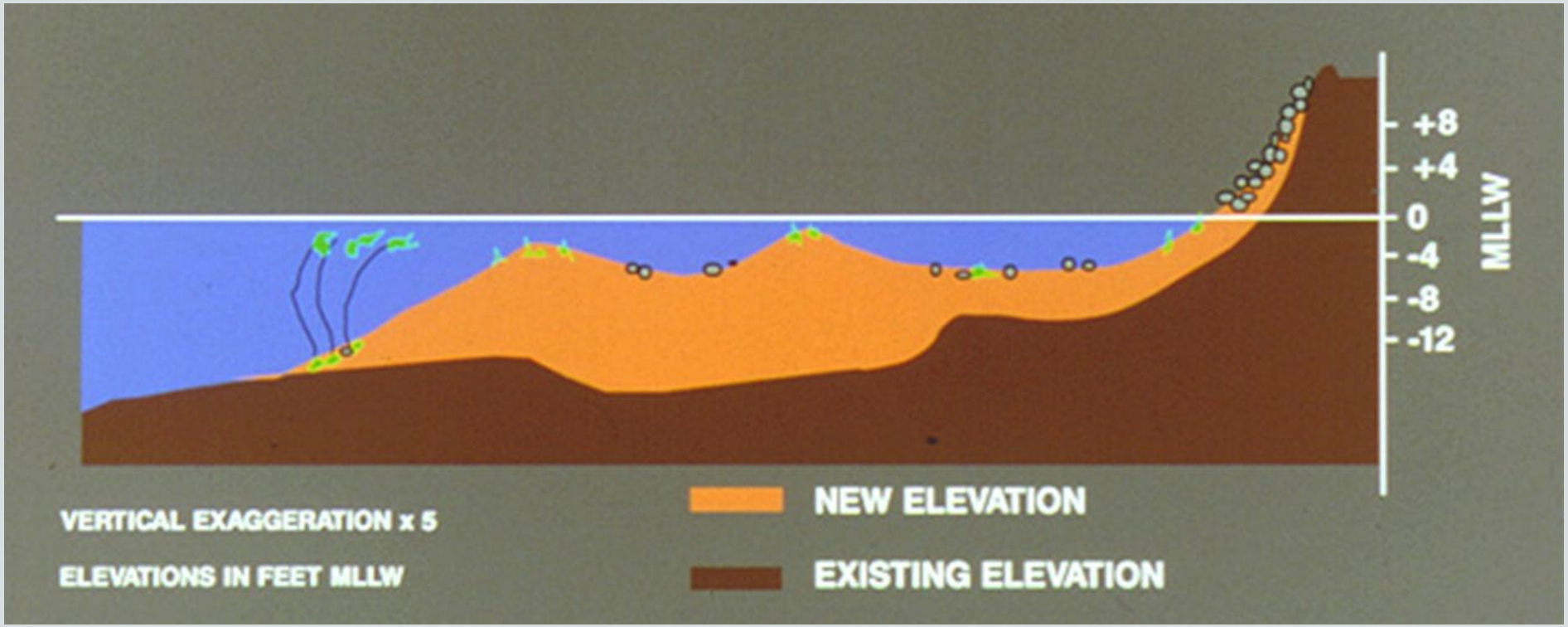
- 17 acres capped by Simpson in 1988
- Integrated chemical isolation and habitat restoration design
  - Hydraulically dredged sands from nearby Puyallup River delta
  - Placed between 4 and 20 feet of cap material
  - Limited dredging near former outfall and confinement beneath cap
- Cobbles and boulders placed in intertidal and shallow subtidal areas to ensure long-term beach stability and improve habitat diversity

Source of Cap Material



Hydraulic Placement of Cap Material

Constructed Cap and Habitat Restoration Profile



Intertidal Mudflat Shortly After Construction

Significant Remedy Scope or Schedule Deviations

- Straightforward cap construction, no significant deviations
- Only localized mixing of cap material into underlying sediment
- Dynamic but gradual changes in cap surface over time
  - Cap depth has remained greater than required design thickness
  - Proactively placed coarser material in localized areas of the cap (less than 2% of the cap volume) in Year 9 and again in Year 15 to ensure stability
  - Cap surface became more muddy over time

When Were External Sources Characterized and Addressed?

- Effective source controls implemented prior to remediation
- Improved process water treatment
- Moved outfall further offshore to improve dispersion

Primary Pre- and Post-Remedy Effectiveness Monitoring Elements

- Fifteen-year monitoring plan
  - Bathymetric surveys
  - Surface sediment chemistry
  - Subsurface coring
  - Water seep sampling
  - Methane gas vent sediment sampling
  - Benthic community sampling
  - Epibenthic community sampling
  - Macrophyte surveys

Did the Remedy Achieve Short- and/or Long-Term Remediation Objectives for Surface Sediment?

- Cap integrity confirmed
- No chemical migration through cap via seeps or gas vents
- Source controls and surface sediment cleanup levels achieved
- Final routine monitoring event in Year 15
  - Future storm/earthquake contingency monitoring

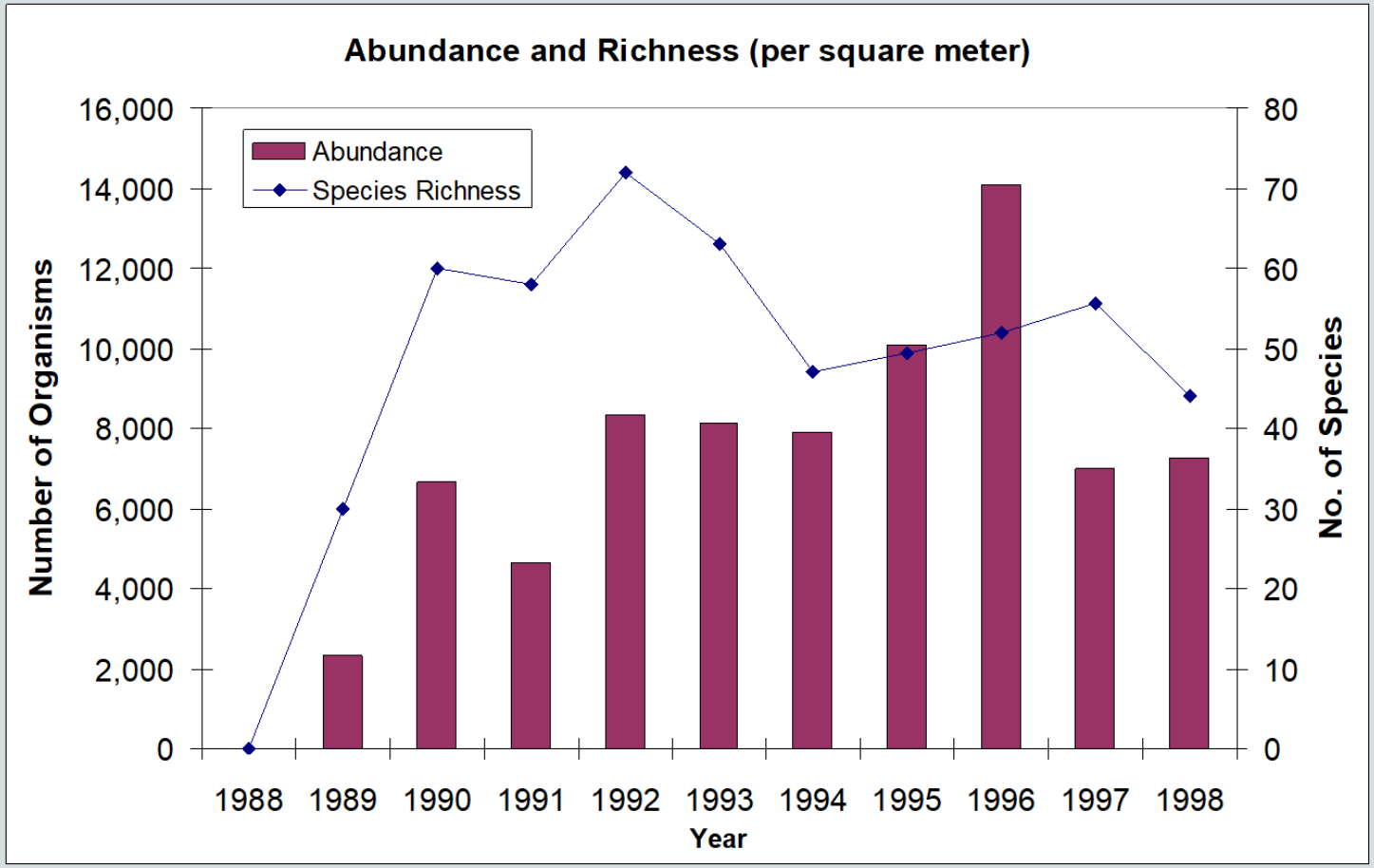
Adaptive Management

- Specific triggers for adaptive management
- Tiered process when triggered
  - Further analysis/discussion of results
  - Additional monitoring/data collection as necessary
  - Take actions as necessary
- Some results triggered further discussions only
- Proactive placement of coarser material prior to any triggers
- Monitoring after storm events confirmed no significant erosion

Is the Remedy on Track to Achieve Long-Term Remediation Objectives for Water and/or Biota?

- Biological recovery was primary measure of project success
- Rapid recolonization by benthic, epibenthic, and plant communities
- Biological communities indistinguishable from reference areas within a few years
- Long-term monitoring now tied to episodic storms and earthquakes
- Regulatory closure (Superfund and NRD)

Biological Recovery Within a Few Years of Construction



Key Take-Home Messages

- Active stakeholder and community involvement is worth the effort
- Cooperative projects have multiple benefits
  - Process and implementation efficiencies
  - All involved work toward a common vision
- Integrated habitat restoration and cleanup
  - Capping can return priority intertidal habitats to industrial bays and provide protective cleanup
  - Long-term monitoring confirmed success
- Flexibility in adaptive management necessary