APPLYING ENGINEERING WITH NATURE WITHIN THE ARMY CORPS OF ENGINEERS- "HEADWINDS AND TAILWINDS"

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13 DEC 2018

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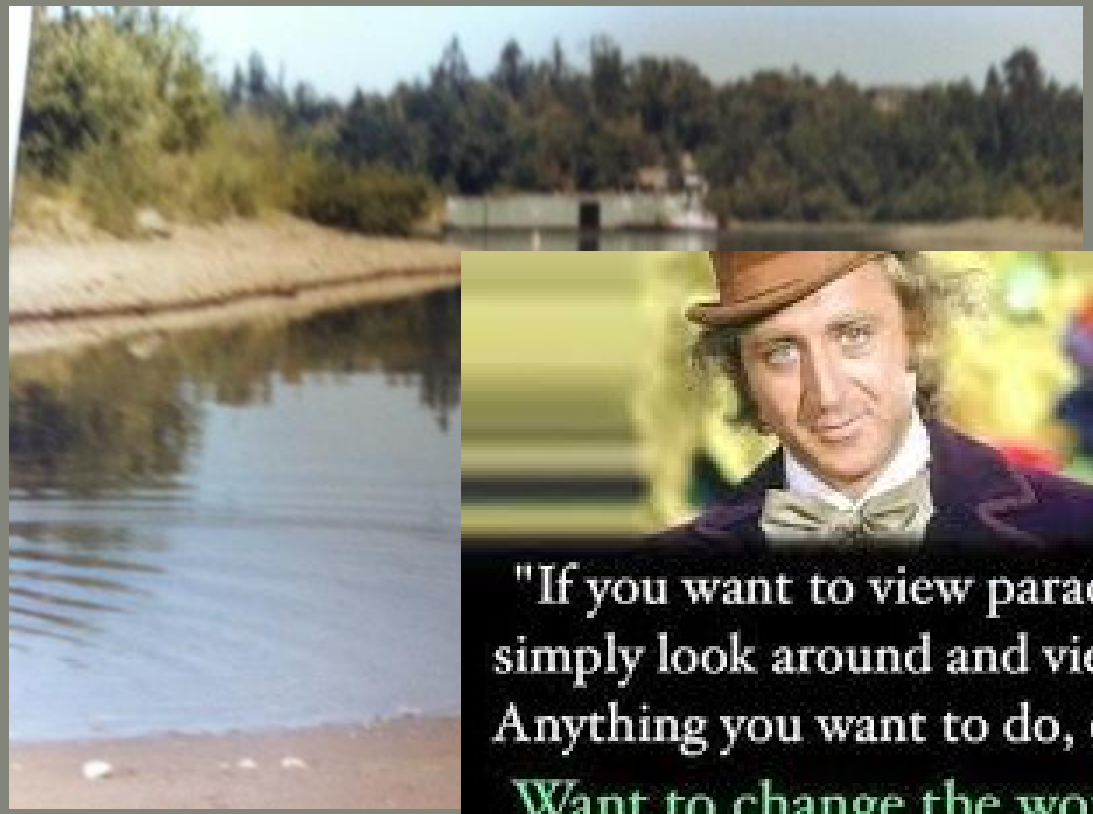

Willamette River, OR
circa 1980

OVERVIEW

- USACE 101 (what we do and how)
- Implementation of EWN within USACE:
  - Headwinds- it takes a little extra work sometimes…
  - Tailwinds- going fast is FUN!!!

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USACE- SECURING OUR NATION'S FUTURE THROUGH WATER

Regulatory permitting of non-Corps actions

Navigation - Commerce, Intn'l Markets, Trade

USACE Operates 24,000 miles of Commercial Waterways; Generates $18 B / 500,000 Jobs Annually; Supports 20% of US Jobs, 1/3 of GDP; Transportation = Decisive US Competitive Advantage

Flood and Disaster Risk Reduction

SACE Prevents > $9 in Flood Damages per $1 Invested; 14,700 Miles Levee ➔ 12,700 Miles = Local O&M; 700+ USACE Dams vs 87,000 National Inventory of Dams

Environment - Ecosystem Restoration and Environmental Stewardship

Hydropower - Inexpensive, Sustainable

USACE is the Nation's Largest Renewable Energy Producer 25% of US Hydropower, 3% of Total US Electricity

Drinking Water/Water Supply

USACE Produces 6.5 Billion Gallons per Day

Quality of Life – Local Economic Engines

USACE is the No. 1 Federal Provider of Outdoor Recreation, Contributing > $16 B to Local Economies

Disaster Preparation/Response; Regulatory

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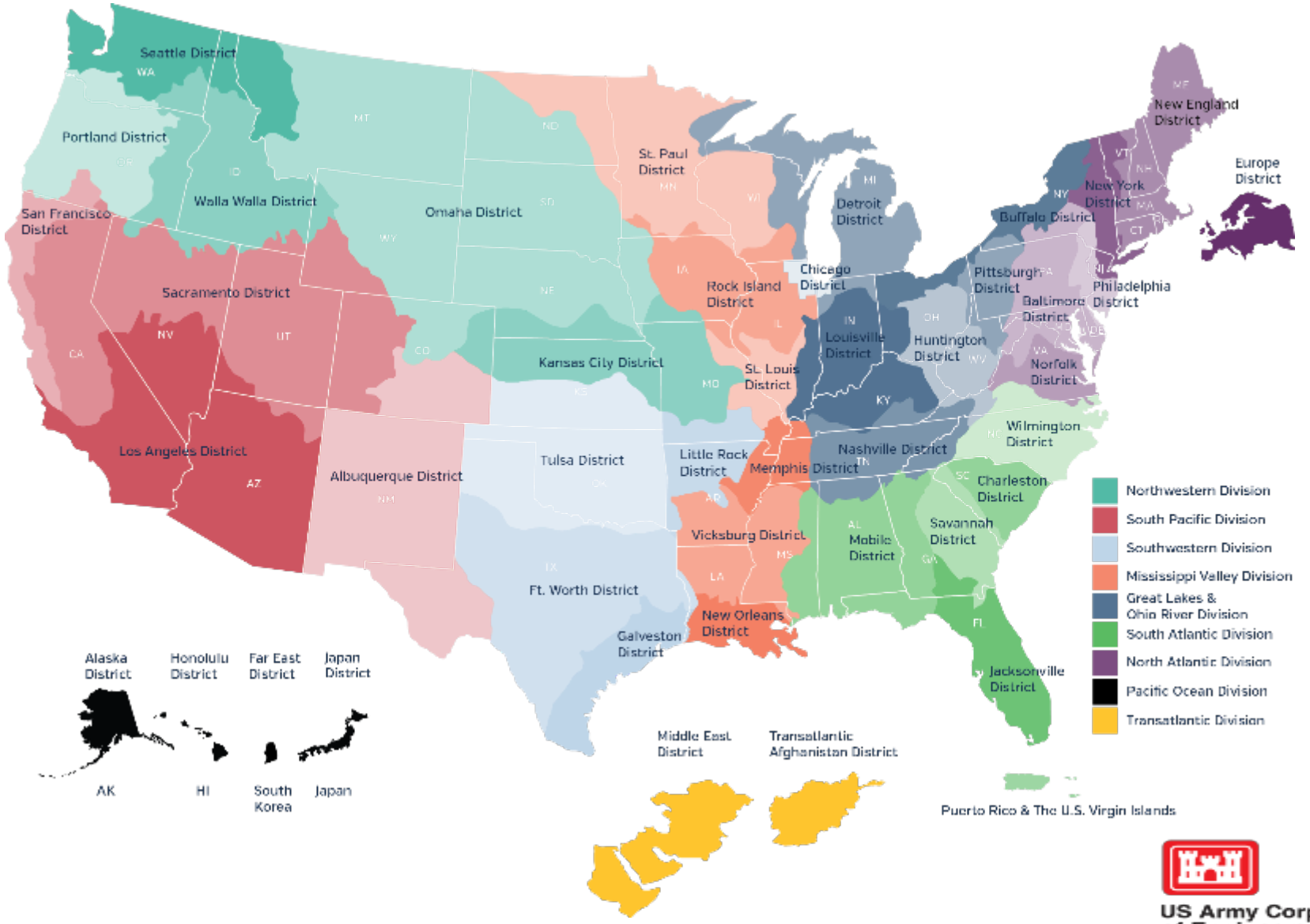
USACE DISTRICTS AND DIVISIONS



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HEADWIND: WORKING WITH USACE IS TOOOOO HARD!!!!

- Takes too long
- Costs too much money
- Too much process
- Complicated processes
- They don’t listen to us
- They don’t understand ecology
- Inefficient, unpredictable funding
- They shouldn’t need an act of Congress to do that, it JUST MAKES SENSE!?

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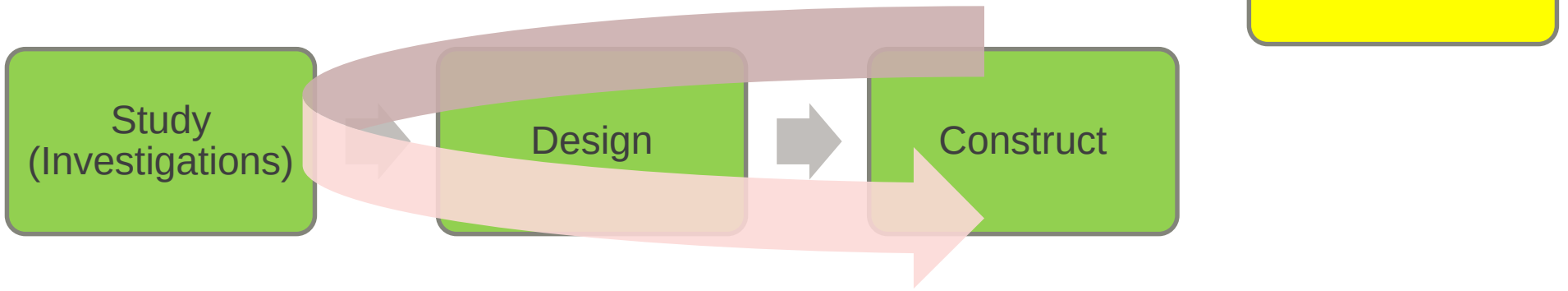
TAILWIND: KNOWLEDGE HELPS
USACE 101

Typical USACE Project Lifecycle



Need funding, annual appropriations AT EVERY STEP

Authorization
Water Resources Development Act/WRDA, Flood Control Act

+

Appropriation
Project-specific via Annual Energy and Water Appropriations Act

CONGRESS
Additional $1-2B
in “Funding Pots”

President/Administration
Budget ($5B)

USACE → Army → Office of Management and Budget (OMB)

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USACE PROCESS AND CULTURE– KEY POINTS

- We **budget** by “business line” or mission area (Navigation, Flood Risk Management, Ecosystem Restoration)
  - We use different metrics for prioritization in each mission (Benefit to Cost Ratio- BCR, life safety, national ecological significance)
- We **formulate** our projects primarily by business line, based on their authority
  - Use different metrics for each mission (transportation costs savings, damages reduced, incremental ecological benefit for the cost- different currencies)
- SMART Planning- requires us to finish studies in 3 years or less (efficient!)
  - Less time to think creatively and incorporate multiple elements
- Engineering with Nature opportunities within each business line, and the magic happens when we incorporate it across MULTIPLE mission areas
- Engineers (generally!) are risk-averse, as is USACE culture

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"HEADWINDS" WITH IMPLEMENTING EWN IN USACE

- Navigation dredging (ocean disposal vs beneficial use)
  - "Federal Standard"- least-cost, environmentally acceptable option (that is sound from an engineering perspective)
  - Non-Federal Sponsor must pay costs; perceived barrier to beneficial use
- Coastal Storm Risk Management (sea wall vs a natural system)
  - Need to justify additional costs- how do we describe the additional benefits (ecological, social, long-term resilience to SLR)
  - Engineering uncertainty about performance
- USACE is budgeted by project, not systems; challenges in operating as a system across business lines (e.g., reservoir mgmt and dredging)
  - Specific projects receive funding annually
  - No requirement to consider regional strategy

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AND…20 MPH TAILWINDS!!

- Administration Focus on INFRASTRUCTURE, DISASTER RECOVERY

- $18 billion supplemental/disaster recovery bill
  - includes 38 new studies
  - Focus on flood risk management
  - How can we do this in a better way??
  - “innovation workshops”

- Change USACE’s way of doing business in ALL MISSION AREAS

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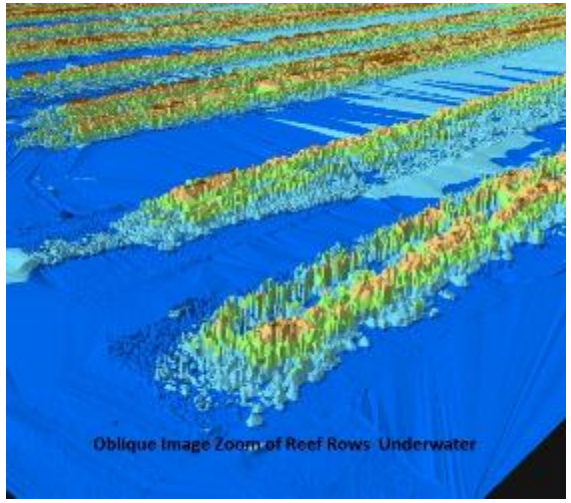
TAILWIND: USACE DEFINITION OF ECOSYSTEM RESTORATION

"The objective of ecosystem restoration is to ***restore degraded ecosystem structure, function, and dynamic processes*** to a less degraded, more natural condition."



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‘14-’18 USACE CIVIL WORKS STRATEGIC PLAN

OVERARCHING STRATEGY

Integrated Water Resources Management (IWRM) is a holistic focus on water resource challenges and opportunities that reflects coordinated development and ma
IWRM
and hea
are con

June 2017 Director’s memo directing us to use risk-informed decision-making, AND better describe the environmental and social benefits of our projects

CROS

System
manage
tools to
nected nature of hydrologic systems (e.g., watersheds) and the economic and ecologic systems they support, and to identify and evaluate management alternatives from both time (life-cycle) and function (multi
purpose) perspectives.

Collaboration and Partne – Build and sustai
collaboration and partnerships at all levels
authorities, funding, talent, data, and research from multiple agencies and organizations.

Risk-Informed Decision Making and Communication – Develop and employ risk and reliability-based approaches that incorporate consequence analysis, especially risk to life; identify, evaluate, and forestall possible failure mechanisms; and quantify and com-

vative financ-
te partnerships
ter resources

nagement is a decision process that promotes flexible decision making that can be adjusted in the face of risks and uncertainties—such as those presented by climate change—as outcomes from management actions and
er events become better understood through moni-
g and improved knowledge.

te-o he-Art Technology – Embrace new and emerging technology for its fullest advantage. Invest in research that improves the resiliency of structures, assists in updating design criteria, and improves approaches toward planning and design.

Producing Efficiencies

Using science and engineering to produce operational efficiencies

Using Natural Processes

Using natural processes to maximize benefit

Broadening Benefits

Increasing the value provided by projects to include social, environmental, and economic benefits

Promoting Collaboration

Using collaborative processes to organize, engage, and focus interests, stakeholders, and partners

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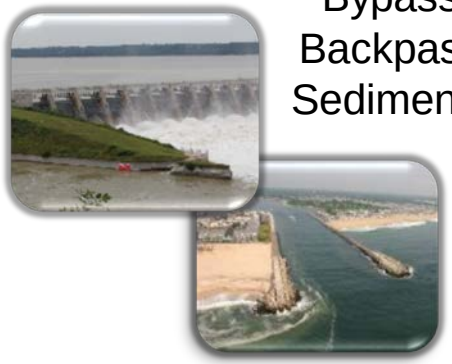
REGIONAL SEDIMENT MANAGEMENT (RSM) GOALS AND STRATEGIES

Reduce Upland/CDF Disposal



Bypass Backpass Sediments

Reduce Erosion

Save Capacity

- Keep sediments in the system
- Mimic natural sediment processes
- Reduce unwanted sedimentation
- Environmental enhancement
- Maintain & protect infrastructure

Stabilize Structures

Reduce Channel Shoaling

Reduce Runoff

Ecosystem Habitat Restoration

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BENEFICAL USE OF DREDGED MATERIAL PILOT PROGRAM (WRDA 2016 SEC 1122)

- Requires the USACE to establish a pilot program to carry out ten projects for the beneficial use of dredged material (for multiple purposes)
- 95 proposals received
- Significant stakeholder and Congressional interest
- WRDA 2018 required 10 additional pilot projects

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WRDA 2016 SEC 1184- CONSIDERATION OF NATURAL AND NATURE-BASED FEATURES

- Requires USACE to consider the use of natural and nature-based features in coastal project formulation

- Requires us to evaluate alternatives in a systems context
  - Consider geophysical setting, effectiveness

- Same level of detail as other alternatives

- Report by 2020 (and 5 and 10 years thereafter)

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CHIEF OF ENGINEERS' ENVIRONMENTAL ADVISORY BOARD

Purpose: a means to gain outside, expert and independent advice on environmental issues facing the Corps of Engineers

Work Tasks:

- Improving environmental metrics and using ecosystem goods and services
- Monitoring and adaptive management improvements
- Inland regional sediment management across business lines

NEED NEW MEMBERS- ASK MINDY!!

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WORK TOGETHER TO SUPPORT EWN ACROSS USACE

USACE- do what our leaders want us to do…find creative opportunities, be creative in how we tell our story and describe benefits

NGOs, non-Federal sponsors- Federal employees cannot lobby- YOU CAN! Visit Congress, USACE, Assistant Secretary of Army (Civil Works), OMB; SHARE successes and failures- we need to learn together

Gov agencies- leverage each others' expertise and funding

KNOW your USACE staff, how your USACE project is authorized and funded, and seek to understand USACE policies so that you can USE them, or work to effectively change them

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CREATIVE AND EFFECTIVE PARTNERSHIPS

- Unique Partnership Natural Infrastructure Initiative:
  - Caterpillar, Inc.
  - AECOM
  - Great Lakes Dredge and Dock
  - The Nature Conservancy

- USACE/NII Collaboration
  - Leverage public and private resources
  - Focus on beneficial use of dredged material and natural and nature-based features
    - “sediment matchmaker” tool

http://www.caterpillar.com/en/company/sustainability/natural-infrastructure.html

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SUMMARY

- Yes, there can be challenges to implementing an EWN approach in USACE projects
- AND….lots of opportunities
- Get creative, get out there and talk to people, and use your imagination!

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