



2017 National Watershed & Stormwater Conference

Welcome to the Webcast

- Continuing Education Credits** – We are offering PDHs for our national watershed and stormwater conference. A registered attendee must watch the entire webcast to be eligible to earn a pdf Certificate of Completion that will be sent out after webcast to the person who registered for the webcast. The certificate will indicate the Number of PDH hours earned. The varying nature of certification requirements for each state means we cannot guarantee that CEU's will be awarded and it is up to the individual to determine if CEU's or PDH's will be awarded based on the policies of their local certifying board. Email webcast@cwpa.org with questions.

2017 National Watershed & Stormwater Conference

To Adjust How the Slides Appear on Your Screen – To make the slide area larger, go to Full Screen under the Meeting Tab.

To Answer a Poll Question – Polling questions appear during the webcast. To answer a poll question, click on the radio button to the left of your answer and click submit. Do not type your answer in the chat box.

To Ask a Question – The right corner of the screen contains a Q&A chat box. Type your question in the box and click on the send question icon to submit it. We will try to answer as many questions as possible during and after the webcast.

2017 National Watershed & Stormwater Conference

Thanks to Our Sponsors

Patron Level

- STRAUGHAN ENVIRONMENTAL
- Ecotone Inc. RIVERS - WETLANDS - FORESTS - WILDLIFE - STORMWATER

Gold Level

- EQR
- STORMWATER MAINTENANCE & CONSULTING

2017 National Watershed & Stormwater Conference

Thanks to Our Sponsors

Silver Level

- FURBISH
- CBTRUST Chesapeake Bay Trust
- res
- stormwatersystems

Bronze Level

- WATERSHED CONSULTING ASSOCIATES, LLC
- HATCHER GROUP Inspiring change for good
- ANDERSON DAVIS
- DDM CONSULTING
- AH
- Wetland

2017 National Watershed & Stormwater Conference

Thanks to Our Hub Location Funders

- Omaha: University of Nebraska - Omaha
- Philadelphia: NATIONAL FISH AND WILDLIFE FOUNDATION NFWF
- Boston: Opti active intelligence | clean water

2017 National Watershed & Stormwater Conference

Webcast Team



Nick DiPasquale, Director,
U.S. Environmental Protection Agency,
Chesapeake Bay Program Office




Clare Billett
Program Officer
William Penn Foundation



Robert Magnien, Director,
NOAA, Center for Sponsored Coastal
Ocean Research



Aja DeCoteau – Watershed
Department Manager for the
Columbia River Inter-Tribal Fish
Commission (CRITFC)



2017 NATIONAL WATERSHED & STORMWATER CONFERENCE


Connecting Practitioners to Innovative Ideas

Tuesday, April 04, 2017
9am-5pm EST

Nicholas A. DiPasquale, Director
Chesapeake Bay Program Office
U.S. Environmental Protection Agency

9

The Chesapeake Bay and Watershed



North America's Largest Estuary

Largest estuary in North America and the third largest in the world.

Home to almost 18 million people. About 150,000 new people move into the watershed each year.

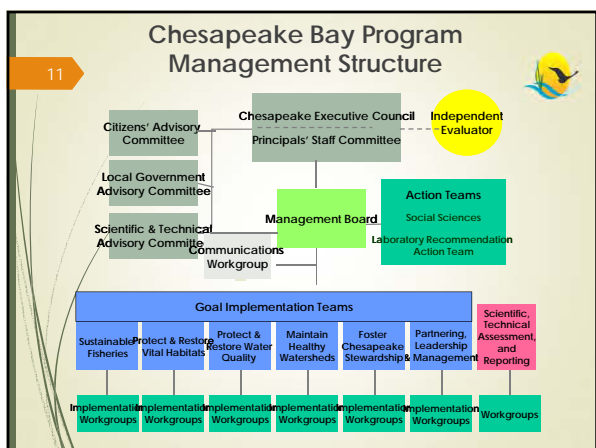
- Tens of thousands of streams, creeks, and rivers are resources for communities throughout the watershed.
- 84,000 farms - primarily family owned

10

History

- Chesapeake Bay Program Formed (1983)
- 1987 Chesapeake Bay Agreement (1987)
- Chesapeake 2000 Agreement (2000)
 - MD, VA, PA, DC, the CB Commission and the Federal Government
- MOU with DE, NY, WV (2000-2002)
- 2009 Executive Order
- 2010 Chesapeake Bay Total Maximum Daily Load
- June 16, 2014 Chesapeake Bay Watershed Agreement





12

Funding

Executive Order led to an annual cross-cut budget for all Federal Agencies working on the Bay

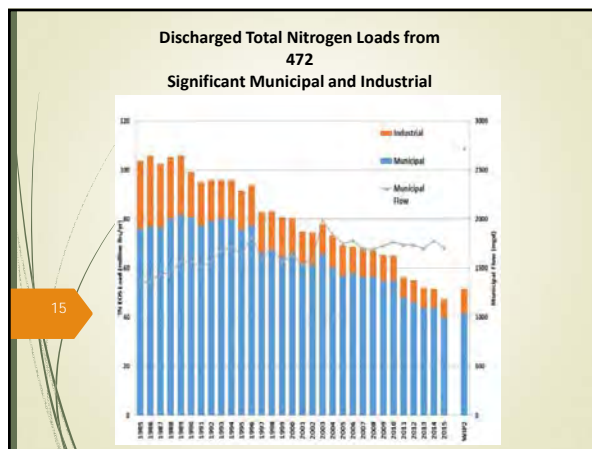
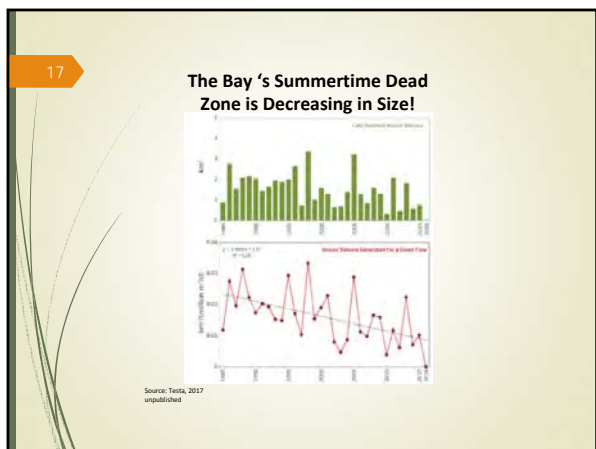
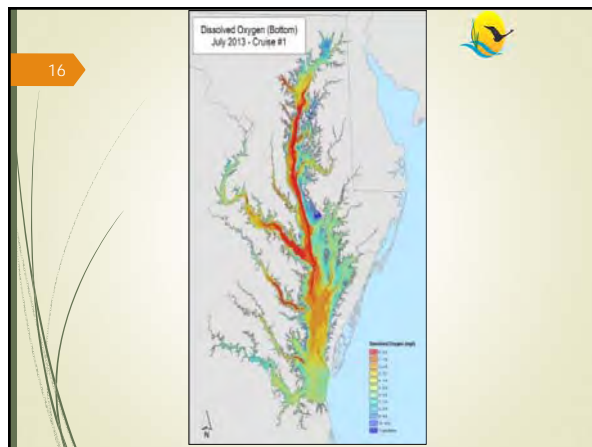
- Approximately \$2.2 billion over 5 years
- Federal Funding ~ \$500 million per year

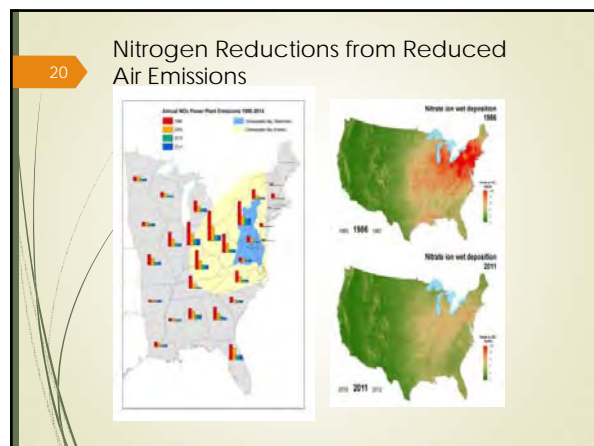
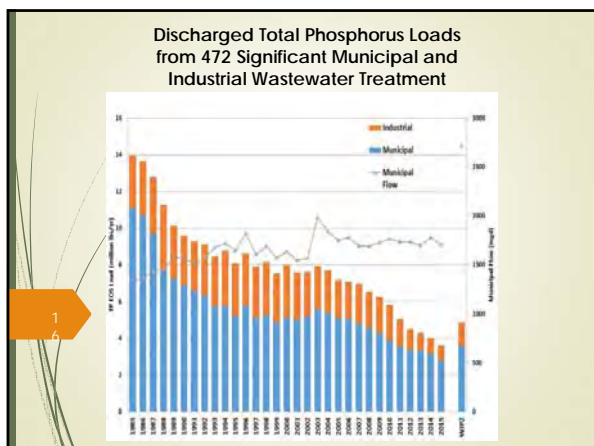
EPA portion through **Clean Water Act, Section 117**

- From \$50M (FY10) to \$73M (FY16) per year
- 2/3 goes to states for support of implementation
- Environmental Finance Center

National Fish and Wildlife Foundation

- 2 grant programs through funding primarily from EPA
 - Small Watershed Grants - \$6M
 - Innovative Nutrient and Sediment Reduction grants - \$6M
- \$65 million since 2010





21

CHESAPEAKE WATERSHED AGREEMENT

On June 16, 2014, the Chesapeake Bay Watershed Agreement was signed

22 Our Goals

Sustainable Fisheries Goal <ul style="list-style-type: none"> Blue Crab Abundance Outcome Blue Crab Management Outcome Oyster Outcome Forage Fish Outcome Fish Habitat Outcome 	Vital Habitat Goal <ul style="list-style-type: none"> Wetlands Outcome <ul style="list-style-type: none"> Black Duck Stream Health Outcome <ul style="list-style-type: none"> Brook Trout Fish Passage Outcome SAV Outcome Forest Buffer Outcome Tree Canopy Outcome
Water Quality Goal <ul style="list-style-type: none"> 2017 WIP Outcome 2025 WIP Outcome Water Quality Standards Attainment and Monitoring Outcome 	Toxic Contaminants Goal <ul style="list-style-type: none"> Toxic Contaminant Research Outcome Toxic Contaminant Policy and Prevention Outcome

23 Our Goals


Land Conservation Goal <ul style="list-style-type: none"> Protected Lands Outcome Land Use Methods and Metrics Development Outcome Land Use Options Evaluation Outcome 	Public Access Goal <ul style="list-style-type: none"> Public Access Site Development Outcome
Environmental Literacy <ul style="list-style-type: none"> Student Outcome Sustainable Schools Outcome Environmental Literacy Planning Outcome 	Resiliency <ul style="list-style-type: none"> Monitoring and Assessment Outcome Adaptation Outcome

24 2015 - 16 Bay Barometer


- Annual report on the health and restoration efforts of the Chesapeake Bay watershed.
- Retrospective summary of previously published indicators
- Audience is CBP partners and the interested public.

25

Positive Trends



Blue Crabs: between 2015 and 2016 the abundance of adult female blue crabs in the Chesapeake Bay increased 92 percent from 101 million to 194 million.




SAV: between 2014 and 2015, underwater grass abundance rose 21 percent (92,315 acres), bringing the total to the highest level in three decades, surpassing the 2017 goal two years ahead of schedule and marking a 50 percent achievement of the overall goal.


26

Positive Trends

Black Duck: an average of 51, 332 black ducks were observed in the watershed states between 2013 and 2015, marking a five percent increase since the last assessment and marking a 51 percent achievement of the overall goal.



Protected Lands: data shows that between 2015 and 2016, one million acres of land were permanently protected from development, a 50 percent achievement of the overall goal.



27

Positive Trends



Water Quality Standards Achievement: an assessment conducted between 2013 and 2015 indicates that 37 percent of the Chesapeake Bay has met water quality standards, a 10 percent increase from the previous assessment.


Reducing Pollution: Computer simulations show that pollution controls put in place between 2009 and 2015 have lowered nitrogen loads 8 percent, phosphorus loads 20 percent and sediment loads 7 percent. For the first time – and ten years ahead of schedule – the wastewater sector as a whole met its pollution reduction goals.



28

Needs Improvement

Forest Buffers: between 2014 and 2015, 64 miles of forest buffers were planted along the Bay's rivers and streams, the lowest restoration total of the last 16 years.



Restoring Wetlands: Between 2010 and 2015, 7,623 acres of wetlands were created or re-established on agricultural land, marking a 9 percent achievement of the overall goal.



29


New Indicators



Diversity

Sustainable Schools

Oysters




30

2015 – 16 Bay Barometer

News Stories

- Tree canopy
- Healthy watersheds
- Forage fish
- Fish habitat
- Blue crab management
- Brook trout
- Toxic contaminants
- Land use
- Citizen stewardship
- Local leadership
- Climate resiliency

31 **TMDL Midpoint Assessment**

Issues:

- Land Use changes
- Climate Change
- Geographic (James River & Conowingo)
- New BMPs
- Phase 6 Models

32 **Chesapeake Bay TMDL 2017 Midpoint Assessment**

- Phase 6 Land Use/Land Cover
- Climate Change
- Local Area Planning Goals
- Phase 6 Model Update
- Conowingo Dam & James River Chlorophyll-a
- 2025 Forecasted Conditions

33 **Chesapeake Bay TMDL 2017 Midpoint Assessment**

- Lag Times and P Saturated Soils
- Water Quality Monitoring Trends
- BMP Expert Panels
- BMP Verification
- BayFAST and other tools

34 **Lessons Learned**

- **Progress is not immediate**
 - Lag times
 - P saturated soils
 - Contaminated groundwater
- **Progress is not linear**
 - Varies with weather/precipitation
 - Varies with location in the watershed

35 **Lessons Learned**

- **Restoration takes time**
 - Changing conditions like climate impacts
 - Ongoing growth and development
 - Emerging contaminants – Personal Care Products, Micro-plastics, Estrogen Disruptors
- **Restoration requires management of expectations**
 - General public
 - Elected officials
- **Comprehensive Approach**
 - Ecosystem-based approach is more effective

36 **Lessons Learned**

- **A Management & Accountability System is Essential for Progress**
 - Allocations
 - Watershed Implementation Strategies
 - 2-Year Milestones (Numeric and Programmatic)
 - Annual Progress Reports
 - Mid-Point Assessment
 - Co-Benefits/Avoided Costs

Lessons Learned

37

- Local Governments do the heavy lifting
- Information & resource sharing is critical
- "One size fits all" doesn't work
- Targeted actions are critical, but difficult
- Maintaining a monitoring network is important
- Use of an adaptive management decision-making framework is important to success
- Shared leadership leads to buy-in



Challenges & Observations in the next 3 to 5 years

38

- The focus will shift to the state and local level
- Funding will become increasingly scarce
- Achieve greater reductions in agricultural runoff
- Address impacts associated with climate change
- Deal with emerging contaminants like personal care products, estrogen disruptors, micro-plastics, etc.
- Demonstrate Multiple Benefits
 - Economic benefits
 - Job creation
 - Avoided costs
- Attract private capital investment

Questions?

39



Chesapeake Bay Program
Science Restoration Partnership

Nick DiPasquale
Director, Chesapeake Bay Program
dipasquale.nicholas@epa.gov

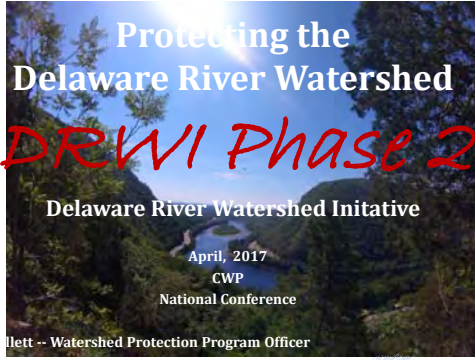
Protecting the Delaware River Watershed

DRWI Phase 2

Delaware River Watershed Initiative

April, 2017
CWP
National Conference

Watershed Protection Program Officer



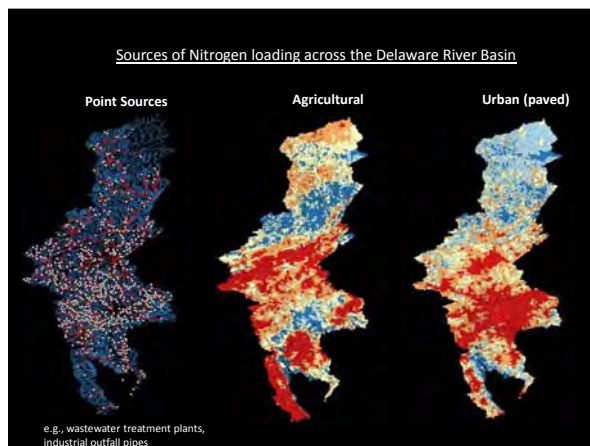
Delaware River Watershed Initiative (DRWI)

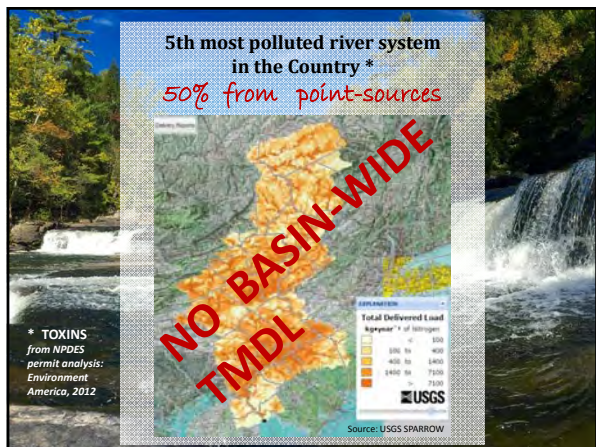
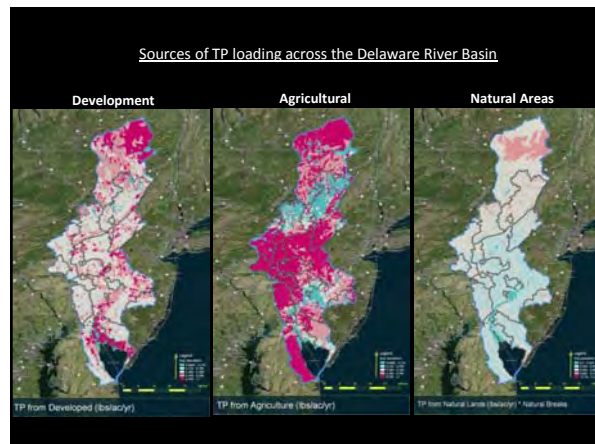
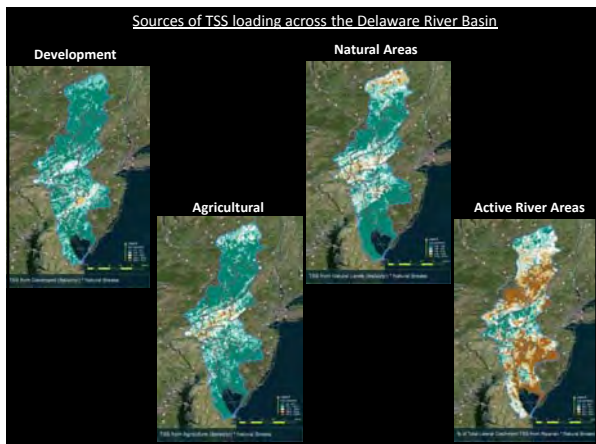
5 1/2 times the size of State of Delaware

DRWI GOAL:
Protect watershed capacity to produce sufficient clean water to maintain human use & ecosystem functions

Challenges:

- Polluted Stormwater & Agricultural Runoff from precipitation
- Erosion Impacts from High Runoff Volume in Paved Suburban/Urban areas
- Forested Headwater Streams being fragmented and developed
- Prior conservation was ad-hoc, providing little measurable collective impact



60% of the waters of the Delaware River watershed are classified as "impaired"

DRWI

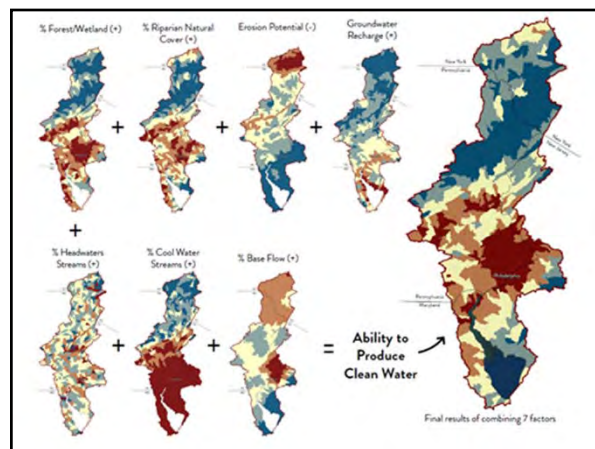
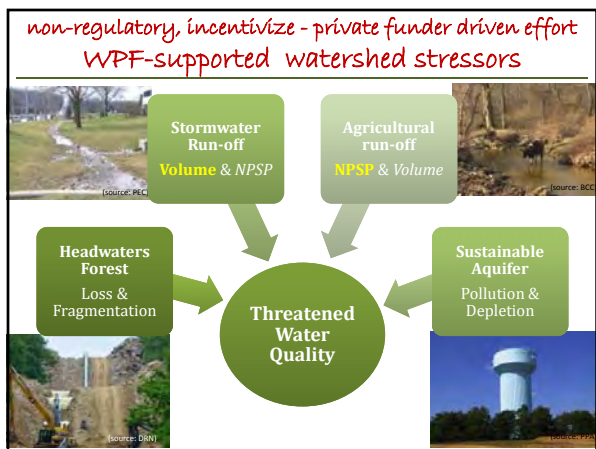
A "grassroots" effort

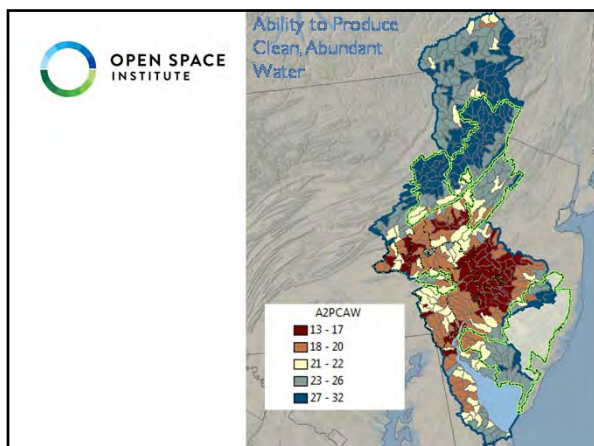
- Private Foundation \$
- Conservation NGOs
- Local Conservation - no basin-wide TMDL

NO "TOP-DOWN" BASIN WIDE MANDATES FROM FEDERAL GOVERNMENT

197 miles of "Special Protection Waters"

The figure includes a map of the Delaware River Basin and Estuary. The basin is outlined in black, and the estuary is shaded in light blue. A green line indicates 197 miles of 'Special Protection Waters' along the river. The map is labeled with state abbreviations: PA, NJ, DE, and MD.





DRWI

- Delaware River Watershed Initiative
 - 8 critical areas
 - 4 key threats

Encouraging aligned priorities for

- Land protection
- Ag and stormwater restoration
- Complementary strategies
- Impact assessment
- 50+ conservation nonprofits



DRWI Phase 1

Plans document \$230M capital & ops needs

\$60+ million provided by WPF so far

- \$15MM for operations
 - Supporting operations for 50+ organizations
- \$6MM for monitoring
 - Maintaining or collecting data from over 300 stream sites
- \$7MM for restoration
 - \$4.5MM to 34 projects leveraging \$11MM
- \$10MM for protection
 - \$4.5MM for 18 projects protecting 15,000 acres leveraging \$44MM
- \$15MM for 1 year extension & Ph 2 plng; incl. land protection and restoration capital grants

Delaware River Basin Sub-Watershed Clusters

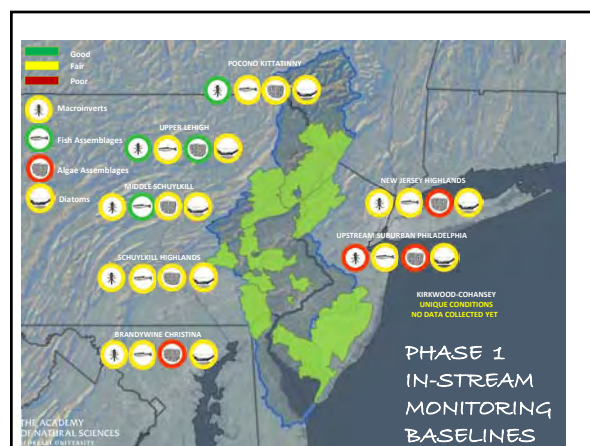
Priority Areas


- Conococheague
- Delaware River Watershed
- Choptank
- Pocomoke and Nantuxet
- Upper Lehigh
- New Jersey Highlands
- Middle Schuylkill
- Schuylkill Highlands
- Upstream Schuylkill-Philadelphia
- Upstream Susquehanna
- Kirkwood-Cohansey Aquifer

Phase 1 Achievements

- Goal: Protect forested headwaters**
 - 15,000+ acres of critical headwaters forest protected to date; \$45MM leveraged match
- Goal: Restoration of degraded wetlands/streams**
 - 8,200+ acres restored; \$11.5MM leveraged
- Goal: Assess progress to inform future actions**
 - 300 water quality monitoring sites established

(Results as of March 2017)





Funds leveraged so far

- \$15 million from USDA
 - NRCS Regional Conservation Partnership Program (RCPP)
- \$60 million total capital leveraged
- Cluster 'operational' match funds ?
(not yet collated)



WPF Watershed Protection

\$30-35 million/yr
via 3 investment strategies:

- DRWI**
(Targeted Sub-Watersheds)
\$12-15 MM/yr
- Constituency Building -- \$8-10 MM/yr
- Watershed-Wide -- \$8-10 MM/yr



...equivalent to

8.6 million
football fields!

Or

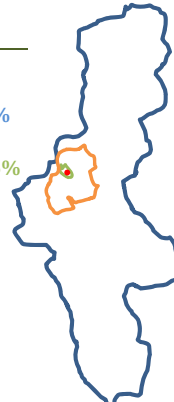
5½ X
State of Delaware

Scale of DRWI

WPF 15MM/yr = ~\$1,000/sq.mile/yr

- Scale of the basin (+8 million acres) → 100%
- Scale of a Cluster (~500,000 acres) → 5%
- Scale of a focus area (~20,000 acres) → 0.25%
- Scale of a project site (~4 acres) → tiny !

SO HOW DOES THIS GET FOCUSED & AGGREGATED TO SHOW IMPACT?



AS AN EVIDENCE-BASED FUNDER...


-- In DRWI phase 2 --

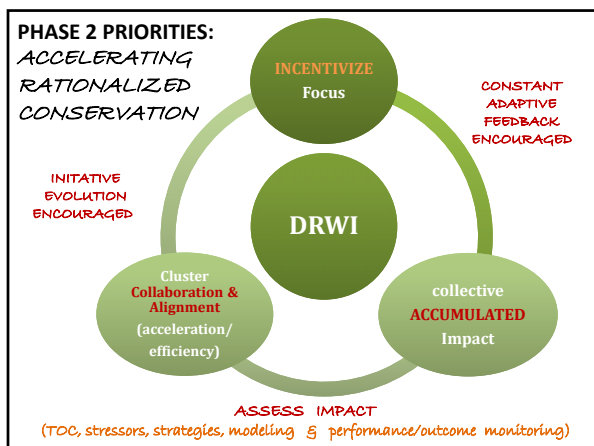
HOW CAN WE ASSURE OUR DRWI GRANTEES CAN DEMONSTRATE MEASURABLE IMPACT for our \$15MM +/- ANNUAL INVESTMENT ?

(required to keep our Family Board members excited by and engaged with watershed protection funding)

SPENDING = IMPACT ???

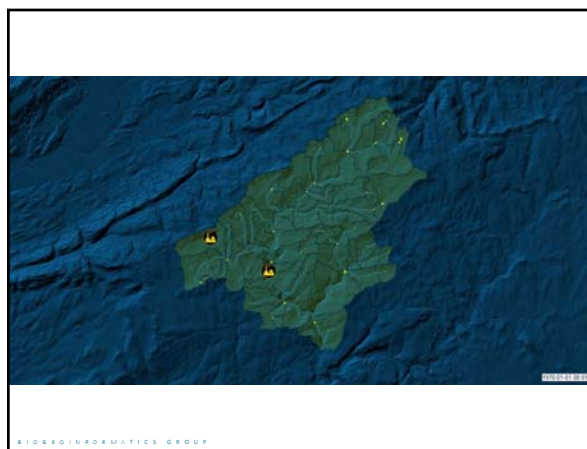
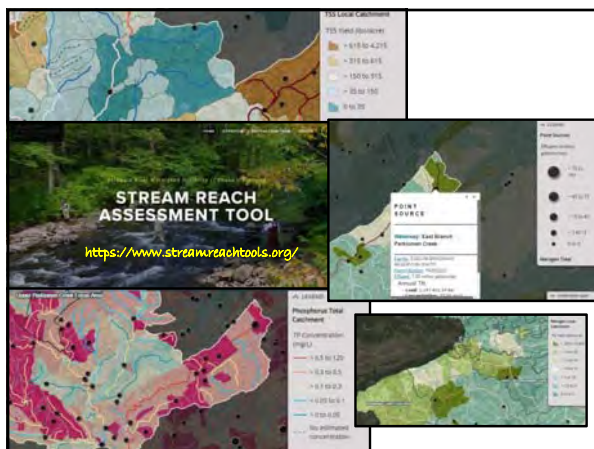
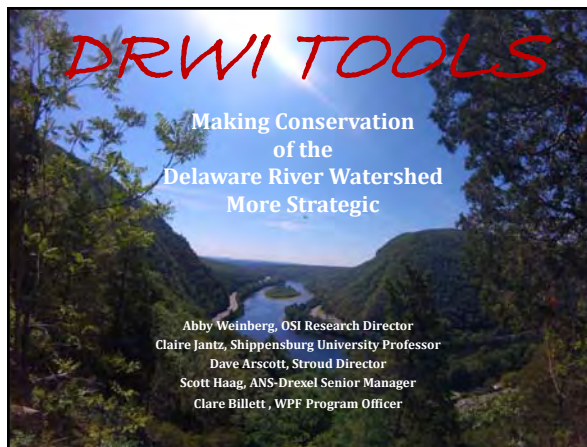
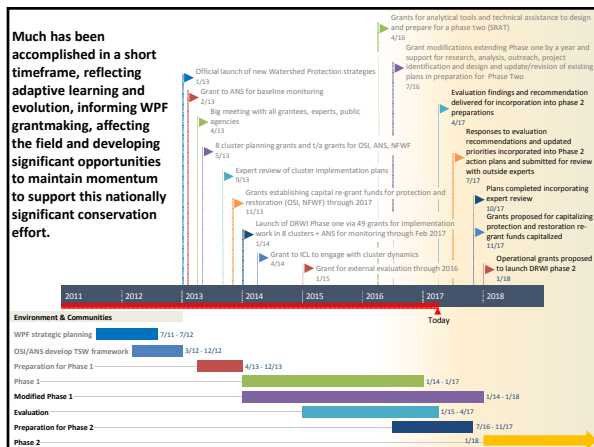
- Project tracking
- Impact evaluation
- External evaluation
- Adaptive management

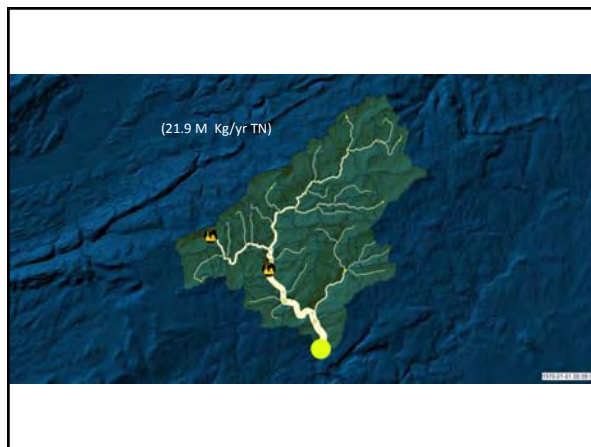
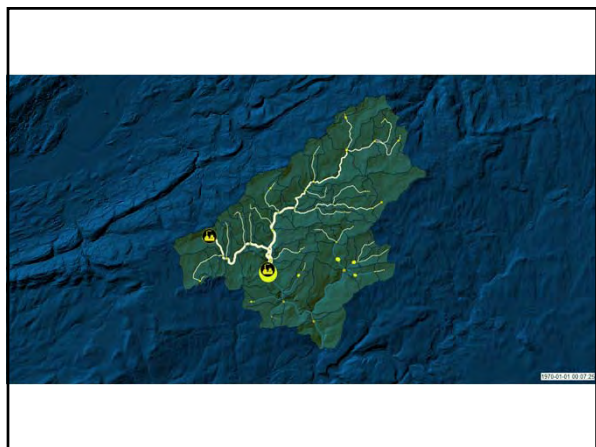
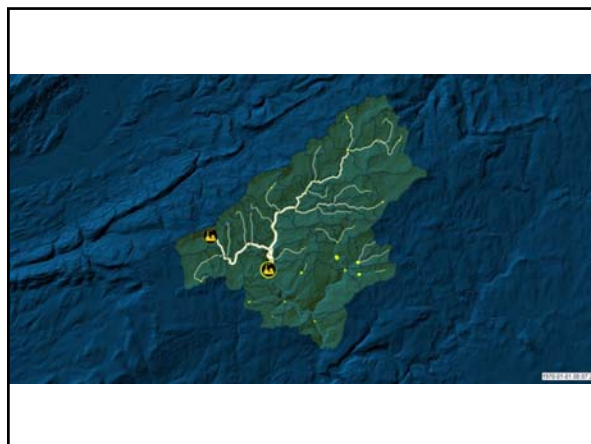
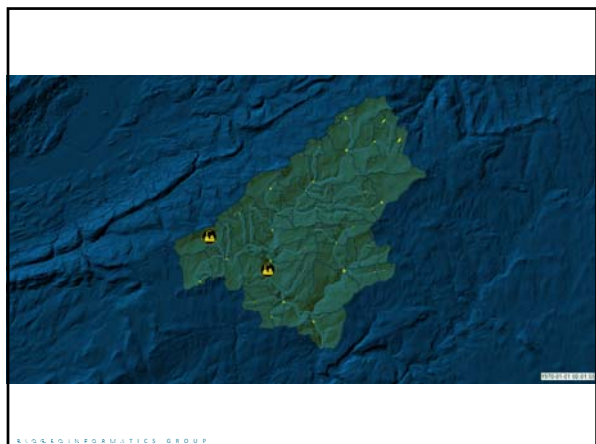




Assessing DRWI PHASE 2 Impact

- SUCCESS STORIES
- FUNDING LEVERAGED
- Ph.2 STRATEGIC ACTION PLANS to drive ENVIRONMENTAL IMPACT? including METRICS to show progress towards DRWI & cluster GOALS within agreed DRWI & cluster THEORY OF CHANGE
 - ✓ performance (quantify effort)
 - ✓ outcome (quantify results)





Model My Watershed® v2 with Enhanced Features:
An online toolkit to model water quality in your watershed

Wiki Watershed

Wiki Watershed

<p>Model My Watershed</p> <p>Launch My App</p>	<p>Model Micro Site Runoff</p> <p>Launch My App</p>	<p>Leaf Pack Network</p> <p>View Leaf Pack Network</p>
<p>EnviroDIY</p> <p>View EnviroDIY</p>	<p>Monitor My Watershed</p> <p>View Real-Time Data</p>	<p>Water Quality App</p> <p>Available from</p> <p>Apple Google Play</p>

DRB2070 Online!

http://drbproject.org/products/

DRWI Cluster Development Inspector: 2011 (left) vs 2070 (right)

How to use this application:

1. Use the recommended browser to view the web application.
2. Log in to your account.
3. Select the cluster you want to view.
4. Click on a location to compare data.

The application is designed to help you understand the current and future land use patterns in your area. The data is based on the most recent available information and is subject to change.

Legend

73

DRB2070 Online!

http://drbproject.org/products/

DRWI Cluster Development Inspector: 2011 (left) vs 2070 (right)

Brandywine-Christina Cluster (Click on to details)

The Brandywine-Christina Cluster encompasses 565 square miles in parts of Delaware and Pennsylvania. It extends from the rolling piedmont in Pennsylvania to the flat coastal plain in Delaware, including the Brandywine, Red Clay and White Clay Creeks, and the Christina River.

Legend

Percent as developed, 2011 (NLCD)	Percent as developed, 2070 (proj)
0-21	0-25

74

DRB2070 Online!

http://drbproject.org/products/

DRWI Cluster Development Inspector: 2011 (left) vs 2070 (right)

Brandywine-Christina Cluster (Click on to details)

The Brandywine-Christina Cluster encompasses 565 square miles in parts of Delaware and Pennsylvania. It extends from the rolling piedmont in Pennsylvania to the flat coastal plain in Delaware, including the Brandywine, Red Clay and White Clay Creeks, and the Christina River.

Legend

2011	2070
0-21	0-25

75

The NEW
LiDAR-based
land cover data

The "old" data
(NLCD)

Land Cover

- Streams
- Water
- Wetlands (emergent)
- Tree Canopy
- Scrub-Shrub
- Low Vegetation
- Barren
- Structures
- Other Impervious Surfaces
- Roads
- Tree Canopy Over Structures
- Tree Canopy Over Other Impervious Surfaces
- Tree Canopy Over Roads

Center for Land Use and Sustainability
University of Maryland System
Spatial Analysis Lab

0 250 500 1,000 Feet

Land Cover

- Streams
- Water
- Wetlands (emergent)
- Tree Canopy
- Scrub-Shrub
- Low Vegetation
- Barren
- Structures
- Other Impervious Surfaces
- Roads
- Tree Canopy Over Structures
- Tree Canopy Over Other Impervious Surfaces
- Tree Canopy Over Roads

Center for Land Use and Sustainability
University of Maryland System
Spatial Analysis Lab

0 250 500 1,000 Feet

DRWI TOOLS

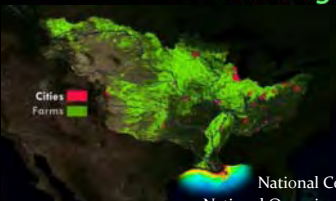
Tools that WPF has invested in that we will explore with you today are:

- Stream Reach Assessment Tool
(OSI, Penn State/Stroud & ANS: ~\$350K)
- WIKI: Model My Watershed
(Stroud & ANS: \$1.5MM)
- Watershed Growth Model Projections
(Shippensburg University: \$500K+)
- High Resolution Land Cover
(University of Vermont: \$500K+)

< \$3MM INVESTMENT - HUGE RETURNS

Mississippi Watershed and Gulf of Mexico

The Nation's Greatest Nutrient Pollution Challenge




Robert E. Magnien
 Director, Center for Sponsored Coastal Ocean Research
 National Centers for Coastal Ocean Science
 National Oceanic and Atmospheric Administration

Overview of Presentation

- Background on watershed and Gulf of Mexico hypoxia
- Goals of interagency cooperation on nutrient reduction and progress to date
- Innovative practices with significant Nitrogen and Phosphorus reductions will need to be widely adopted to reach aggressive goals
- Thoughts for the future

Mississippi R Basin is Highly Altered

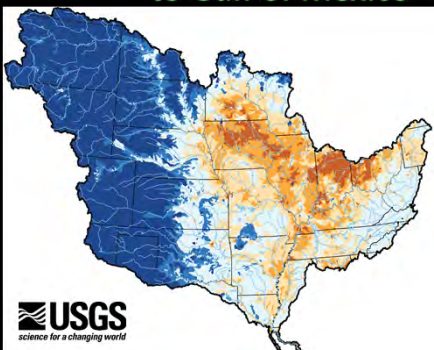
Extensive wetland drainage has altered hydrology, enhancing transport of nutrients to the Gulf



Artificially Drained Land, MRB, Millions of Acres

Figure 2. States with notable wetland loss, 1780's to mid-1950's. Source: Modified from Dahl, 1992.

Total Nitrogen Yields Transported to Gulf of Mexico

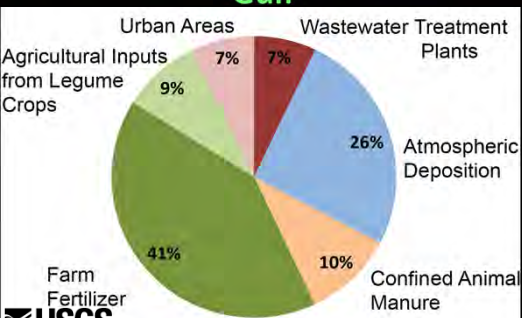


Total nitrogen yield delivered to the Gulf of Mexico from each catchment, in Kg/sqkm/yr

- >1,660 High
- 923 - 1,660
- 456 - 922
- 99 - 455
- 36 - 98
- 0 - 35 Low

USGS science for a changing world

Sources of Nitrogen Delivered to the Gulf



Source	Percentage
Farm Fertilizer	41%
Atmospheric Deposition	26%
Confined Animal Manure	10%
Agricultural Inputs from Legume Crops	9%
Urban Areas	7%
Wastewater Treatment Plants	7%

USGS science for a changing world

Nitrogen Loading to the Gulf has Increased Significantly Over Past 50 Years

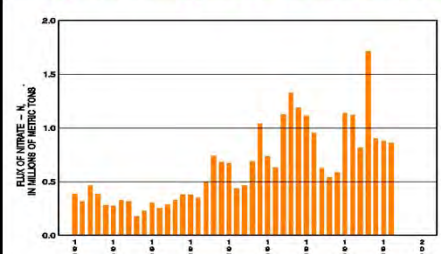
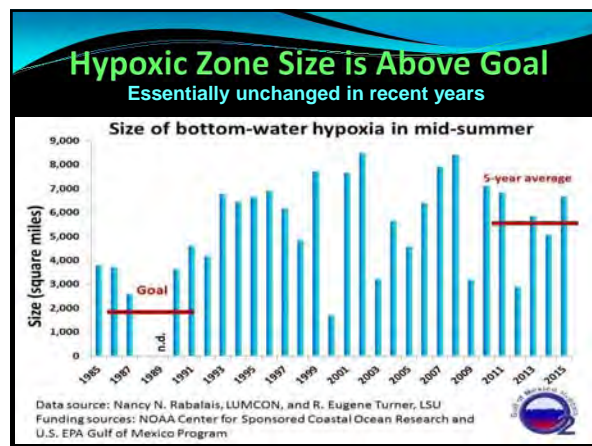
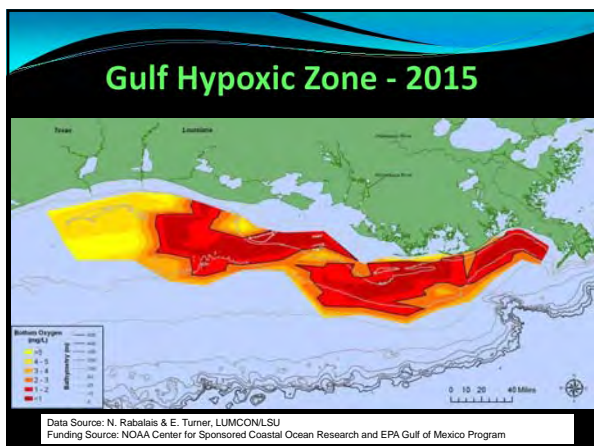


Figure 3.— ESTIMATED ANNUAL FLUX OF NITRATE - N FROM THE MISSISSIPPI RIVER BASIN TO THE GULF OF MEXICO - 1968-1998



Advanced Modeling Tools to Guide Management: ROMS 3D Output - 2016

Dynamically couples watershed and offshore, providing the opportunity to address complex management issues

Advanced Modeling Tools to Guide Management: NOAA National Water Model

NOAA launches America's first national water forecast model

- 2.7M river reaches
- Hours to 30-day forecasts
- Utilizes weather forecasts and assimilates precip and streamflow observations
- Sets stage for expansion to WQ

Seamless Simulation of Nation's Hydrologic System


Hypoxia Task Force Goals-2015 Update

- Retained original goal of reducing the areal extent of the Gulf of Mexico hypoxic zone to less than 5,000 km²; extended attainment from 2015 to 2035
- Established interim target of a 20 percent nutrient load reduction by the year 2025
- Despite current efforts, recent nutrient loadings to the Gulf are essentially unchanged

How to Overcome Gap Between Current Practices and Goal

- Not nearly enough funding for voluntary incentive-based programs to reach goals
- Regulation not a near-term solution
- Must find win-wins that reduce nutrients and benefit producers to reach widespread adoption of practices that significantly (20-60%) reduce nutrients

Cover Crops



- Can reduce nutrient losses during non-growing season in the range of 20%-60%
- Builds soil health and productivity
- Prevents erosion and reduces need for fertilizers
- Large potential for adoption but currently estimated at less than 2% of cropland in MS Basin

- Education, technical assistance and infrastructure needed to boost adoption
- Avoidance of risks and elimination of policy barriers also needed
- Perennial crops could offer year-round "cover" and even greater benefits



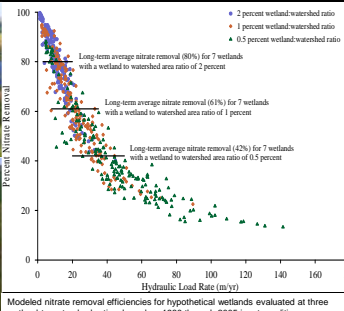


Photo supplied after corn is done. Photo courtesy of the Lower Cloud Watershed Watershed Council.

Wetland Re-Creation in Strategic Locations

- Iowa has been a leader under its CREP
- Can reduce influent Nitrogen by 30-70% cost-effectively
- 82 completed, 13 under development – each treating 500-4,000 acres

Modelled nitrate removal efficiencies for hypothetical wetlands evaluated at three wetland to watershed ratios, based on 1999 through 2005 event conditions.

Drainage Water Management

- Opportunity to manage water flows with new drainage systems replacing old tile drains
- Can reduce water and Nitrogen leaving field 20-60%
- Combined with other practices (e.g. wood chip bioreactors, wetlands) can further limit N losses






Advanced Drainage Systems, Inc.

Strock, J. et al 2010

Runoff Risk Advisory Forecast

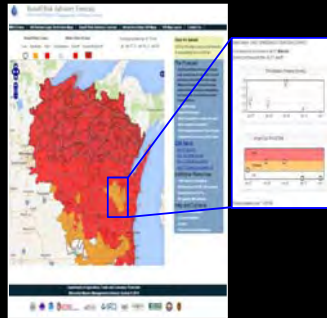

- Decision support tool utilizing weather forecasting products to improve short-term fertilizer/manure application decisions
- Science based approach validated with on-farm data
- Leads to reduction of applied nutrients into waterbodies
- State working groups (multi-agency, academic, industry) guide efforts including maintaining websites and conducting outreach
- Runoff Risk concept (modeling & delivery) expected to continually evolve



Great Lakes Restoration


Runoff Risk Advisory Forecast Current Version in Wisconsin

- NWS forecast models are post-processed to identify conditions primed for runoff
- Validated against edge-of-field observations
- Current tool was proof of concept, operated by WI Dept of Agriculture and University of Wisconsin
- Strictly decision support, not regulatory


Future-Looking Perspectives

- Need to find ways to overcome barriers to win-win solutions that can be widely-adopted voluntarily without incentives
- Stakeholders should be informed of impacts and solutions from local (e.g. drinking water) to state to regional levels (e.g. Gulf hypoxia)
- Climate change is likely to make attainment of goals even more challenging
- New modeling tools and research may help lead to additional innovative solutions




The Columbia River Basin
Aja K. DeCoteau, Watershed Department Manager

April 4, 2017




The Columbia River Basin


- Overview of the Basin and its uses
- What makes the Basin unique?
- Tribes and Treaty Rights
- Major challenges
- Successes
- Lessons Learned



Columbia River Inter-Tribal Fish Commission




The Columbia River Basin



- 260,000 sq. miles, 1,270 river miles, 165 million acres
- 4th largest river in the U.S. in volume of water flow
- Avg. annual runoff at the mouth is 198 million acre feet
- Avg. annual streamflow is 265,000 cfs at the Dalles Dam

Columbia River Inter-Tribal Fish Commission



Columbia River Basin



Columbia River basin
165 million acres


Texas
172 million acres

France
159 million acres

Columbia River Inter-Tribal Fish Commission




The Columbia River Basin



- 7 States: **Washington, Oregon, Idaho, Montana, Nevada, Utah & Wyoming**
- 2 countries: U.S. & Canada (B Province)
- 4 mountain ranges: Rockies, Selkirks, Cascades & Coastal mountains
- Largest tributary: Snake River (1,038 miles)
- 60 Major Dams: 29 Federally operated with more than 230 total in Basin

Columbia River Inter-Tribal Fish Commission



Columbia River Uses


- Hydropower
- Flood Control
- Fish & Wildlife Habitat
- Fish Migration
- Navigation
- Irrigation
- Recreation
- Water Supply
- Cultural Resources





What Makes the Basin Unique?

- Geologic History
- Topography
- Hydrologic Cycle
- Hydropower System
- Fish & Wildlife
- Tribes and Treaty Rights





- Vast ecosystems: riparian zones, tributaries, wetlands, forests, estuary, shrub-steppe
- Multiple jurisdictions and co-management authority

Columbia River Inter-Tribal Fish Commission

CRITFC Tribes' Ceded Lands

Columbia River Inter-Tribal Fish Commission (CRITFC) tribes:

- Yakama Nation
- Nez Perce Tribe
- Umatilla
- Warm Springs

Combined, the land comprising this ceded area:

- 66,591 square miles
- More than 25% of the entire Columbia Basin
- 55% of the rivers and streams that are still accessible to salmon (22,000 miles)

First Foods

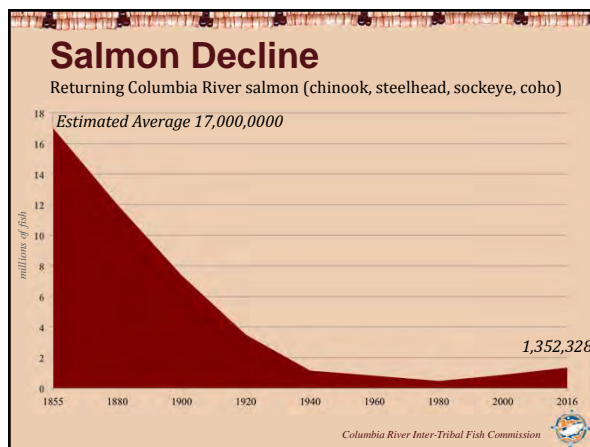








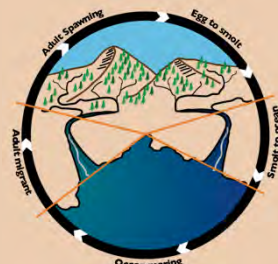
Columbia River Inter-Tribal Fish Commission



Wy-Kan-Ush-Mi Wa-Kish-Wit

Spirit of the Salmon

- The only comprehensive plan in the Basin by tribes
- Framework for restoring anadromous fish stocks throughout their lifecycle
 - Protection of treaty rights
 - Habitat protection and restoration
 - Natural production
 - Holistic decision-making
- Institutional and Technical recommendations



Salmon Life Cycle: Gravel-to-Gravel Management
plan.critfc.org

Columbia River Inter-Tribal Fish Commission

Future Challenges

- Climate Change
- Water Supply
- Columbia River Treaty
- Funding Uncertainty
- Habitat Protection and Restoration
- Water Quality and Toxics Reduction
- Coal and Oil Transportation
- Fish Passage and Reintroduction
- Floodplain Functions
- Floodrisk management

- Pacific Salmon Treaty
- Ongoing litigation: Bi-Op & EIS
- US v Oregon 10 yr. agreement
- Predation
- Aquatic Invasive Species



Future Climate: What to Expect

- **Rising air temperatures:**
 - Decrease snowfall
 - Increase rainfall in winter months
 - Shifts in timing and quantity of runoff
 - Warmer water
- **Increase:**
 - Flooding
 - Inundation
 - Sedimentation
 - Erosion
 - Droughts
- **Increased competition for water use for fish, hydropower, navigation, irrigation & municipal use**

Air Temperature Projections for the Pacific Northwest

Summer mean temperature
RCP4.5
RCP8.5

Yakama River Inter-Tribal Fish Commission

Climate Change Impacts: First Foods

- Tribal populations dependent on natural resource are among the most climate sensitive communities
- Threatens First Food resources, culture, ways of life, and tribal treaty rights
- Natural resources are our cultural resources
- Continue to identify, assess and understand future impacts on First Foods and develop adaptive strategies
- Tribes have been adaptively managing their resources for

Yakama River Inter-Tribal Fish Commission

Successes: Coalition Building

Yakima Basin Integrated Plan

Columbia River Treaty: 15 Tribe Coalition

Yakama River Inter-Tribal Fish Commission

Yakima Basin Integrated Plan

- **Problem:**
 - Current water supply does not meet instream or out-of-stream demands for fish, wildlife, irrigation and municipal supply
 - Does not account for future deficits as the population grows and climate change reduces snowpack
- **Challenges:**
 - Decades of fighting, mistrust, misrepresentation and miscommunication
 - Multiple failed plans and processes that did not represent or include all interests
 - Frustration by the Yakama Nation, NGO's, state, local and federal agencies, and irrigation districts

Figure 1-1 Yakima River Basin

Yakima Basin Integrated Plan

- **Solution:**
 - Yakama Nation and Roza Irrigation District met to lay out what are now the 7 principles and signed joint letter
 - Gained support from similar interests
 - Washington State Dept. of Ecology and Bureau of Reclamation took the principles and developed a Work Group
- **Broad Support:**
 - Yakama Nation
 - Irrigators
 - Conservationists
 - Recreational organizations
 - Business groups
 - Republican & Democratic party organizations
 - Local, state and federal government and agencies

Yakama River Inter-Tribal Fish Commission

BUILDING A FUTURE FOR WATER, WILDLIFE AND WORKING LANDS

YAKIMA RIVER BASIN INTEGRATED WATER RESOURCE MANAGEMENT PLAN

Historical Fish Restoration

1. Restore the Columbia River to historic levels to meet FWS and other agency needs
2. Restore the Columbia River to historic levels to meet FWS and other agency needs
3. Restore the Columbia River to historic levels to meet FWS and other agency needs
4. Restore the Columbia River to historic levels to meet FWS and other agency needs
5. Restore the Columbia River to historic levels to meet FWS and other agency needs

Water Conservation

1. Implement an aggressive water conservation program designed to conserve 100,000 acre-feet of water in peak river years
2. Create a fund to promote water conservation and water saving technologies, including water saving programs, water saving devices, and water saving incentives
3. Create a water conservation program to promote water saving technologies, including water saving devices, and water saving incentives
4. Create a water conservation program to promote water saving technologies, including water saving devices, and water saving incentives

Water Quality

1. Protect 100,000 acres of riparian habitat, riparian habitat, and riparian habitat in the Yakima River Basin. Riparian habitat is critical to riparian fish and wildlife.
2. Riparian habitat is critical to riparian fish and wildlife.
3. Riparian habitat is critical to riparian fish and wildlife.

Water Storage

1. Develop a water storage program to provide additional water storage capacity for the Yakima River Basin.
2. Develop a water storage program to provide additional water storage capacity for the Yakima River Basin.
3. Develop a water storage program to provide additional water storage capacity for the Yakima River Basin.

Water Distribution

1. Develop a water distribution program to provide additional water distribution capacity for the Yakima River Basin.
2. Develop a water distribution program to provide additional water distribution capacity for the Yakima River Basin.
3. Develop a water distribution program to provide additional water distribution capacity for the Yakima River Basin.

Yakima Basin Integrated Plan

- Outcome: 30 year strategy over 10-year phases (1st phase underway) to address water supply for instream and out-of-stream demands:
 1. Reservoir Fish passage
 2. Fish habitat protection and enhancement
 3. Modifying existing structures and operations
 4. Surface water storage
 5. Market-based reallocation
 6. Groundwater storage
 7. Enhanced water conservation
- \$3 billion projects:
 - Provide reliable water for existing agriculture
 - Restore all native salmon and steelhead to historic locations
 - Address all interests equally



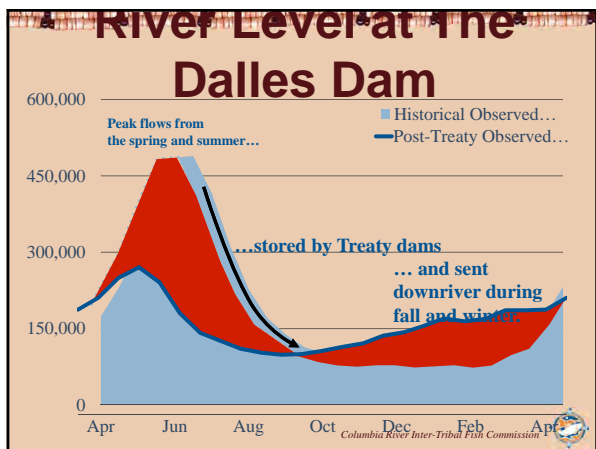

Columbia River Inter-Tribal Fish Commission

Columbia River Treaty


- Treaty came into force in 1964, no end date
- No fish passage at dams
- Twin goals:
 - optimize hydropower
 - coordinate flood control
- With 10 year notice, Treaty may be terminated in 2024
- Tribes not consulted, no fish & wildlife coordination



Columbia River Inter-Tribal Fish Commission



Permanent Floods Created Upriver to Protect Portland from Flooding



Relocating a Church from Waldo
Now under Kooncanus Reservoir



Mica Dam built in 1973



Kinbasket Reservoir
Drawdown Effects



Vanport Flood, near Portland
Columbia River Inter-Tribal Fish Commission

Columbia River Inter-Tribal Fish Commission

Columbia River Treaty and its effects on Columbia Basin tribes

- Tribes were not consulted, they did not provide prior and informed consent on Treaty.
- Tribes were forced to make substantial sacrifices to cultural, health, social, religious and ecosystem resources for development and continued operation of the hydropower system.



1941: traditional chiefs of the Colville Indian
Reservation at the Grand Coulee Dam construction site.

Columbia River Inter-Tribal Fish Commission

Columbia Basin Tribes

15 tribes with management authorities and responsibilities affected by the Columbia River Treaty

2009 - Formed
2010 - Common Views
2011 - First Nations G2G



Formed to gain seat at the negotiating table with other sovereigns

Columbia River Inter-Tribal Fish Commission

Regional Recommendation: Three Purposes


- Maintain coordinated flood risk management and protect public safety and region's economy.
- Maintain coordinated hydropower operations and a reliable, economically sustainable hydropower system.
- Modernize the Treaty to further ensure a more comprehensive ecosystem-based function approach throughout the Columbia River Basin watershed.



1948 Vanport flood
Columbia River Inter-Tribal Fish Commission

Regional Recommendation: Additional Elements


- Meet regional needs for irrigation, municipal and industrial use, in-stream flows, navigation and recreation.
- Incorporate new or formalized mechanisms or provisions into Treaty that allow for adaptation and flexibility to address changes.
- Adapt the Treaty to future changes in climate



Columbia River Inter-Tribal Fish Commission

Ecosystem-based management approach

- Restore and preserve tribal natural and cultural resources
- Restore spring freshets
- Restore fish passage to all historic locations (structural)
- Minimize draw downs at upper reservoirs
- Reconnect and restore floodplains
- Pursue coordinated flood risk management after 2024 that provides for an acceptable level of flood risk.



Columbia River Inter-Tribal Fish Commission

Lessons Learned

- Relationship building takes time but results in meaningful action, support and trust
- Broader visions can identify shared interests and goals between opposing parties
- All interests must agree to give and take for the common vision
- Coalitions within communities are most effective when built from the bottom up
- As sovereign nations, tribes play an integral role and must be consulted and included early on in any process
- A coalition of tribes (or other entities) has a much stronger voice


Columbia River Inter-Tribal Fish Commission

Lessons Learned

- Create forums, workshops and conferences that include all interests, especially if in opposition, in order to gain broader knowledge of the issues and potential ways to work together
 - Future of Our Salmon conferences, Transboundary conferences, etc.
 - Universities Consortium on Columbia River Governance (5 universities)
 - International Columbia River Basin Forum (created by tribes & First Nations)
- Create a youth component/network/caucus in future processes in order to engage, inform, and mentor and allow the next generation to become advocates, conduct research and ultimately lead.




Columbia River Inter-Tribal Fish Commission



Tribal elders taught us that if we take care of the First Foods, the First Foods will take care of us

Columbia River Inter-Tribal Fish Commission

CENTER FOR WATERSHED PROTECTION 2017 National Watershed & Stormwater Conference CENTER FOR WATERSHED PROTECTION ASSOCIATION



Questions?

The slide features a cartoon character with spiky orange hair, a wide-eyed expression, and a red jacket, surrounded by several blue question marks. The character appears to be in a state of confusion or seeking answers. The slide is framed by a green header with logos for the Center for Watershed Protection and the 2017 National Watershed & Stormwater Conference.

CENTER FOR WATERSHED PROTECTION 2017 National Watershed & Stormwater Conference CENTER FOR WATERSHED PROTECTION ASSOCIATION

Thanks for Joining Us for Session 1
The State of Our Watersheds

The next 2 online webcasts will be:
**Celebrating 25 Years of the Center for Watershed Protection,
Looking Back and Looking Forward**
Begins at
1 PM Eastern
12 PM Central
11 AM Mountain
10 AM Pacific

**Innovation in Practice – Integrated Water Resources
Management and Implementation**
Begins at
1:30 PM Eastern
12:30 PM Central
11:30 AM Mountain
10:30 AM Pacific

Just keep your connection to the conference open (don't leave
Adobe Connect) and we'll see you then!

The slide contains text announcing the next two webcasts. It includes the title of the first webcast, 'Celebrating 25 Years of the Center for Watershed Protection, Looking Back and Looking Forward', and its start times in four time zones. It also lists the second webcast, 'Innovation in Practice – Integrated Water Resources Management and Implementation', with its corresponding start times. A final note asks attendees to keep their Adobe Connect connection open.