Corps of Engineers Involvement in Aquatic Invasive Species Research and Management

- Corps of Engineers – first federal agency charged by Congress to address invasive species (River and Harbor Act 1899)
- Current aquatic plant research activities began in 1958
  - Aquatic Plant Control Research Program (APCRP) - 1973
- Research on aquatic nuisance animals began in 1990 (Non-indigenous Aquatic Nuisance Prevention & Control Act 1990)
  - Zebra Mussel Research Program (1990-1995)
  - Aquatic Nuisance Species Research Program (ANSRP) - 1996
USACE Aquatic Invasive Species Research Programs

Aquatic Plant Control Research Program

HQ Program Manager: Mr. Tim Toplisek
EL Technical Director: Dr. Al Cofrancesco
EL Program Manager: Dr. Linda Nelson

Aquatic Nuisance Species Research Program

HQ Program Manager: Mr. Joe Wilson
EL Technical Director: Dr. Al Cofrancesco
EL Program Manager: Dr. Linda Nelson
Research Program Goals

- Provide science-based guidance on the use of new technologies for detecting, managing, preventing, and monitoring aquatic invasive species that impact Corps projects
- Reduce impact of aquatic nuisance species on Corps operations and infrastructure
- Reduce impact of aquatic nuisance species on T&E species
- Reduce O&M expenditures associated with aquatic invasive species management
- Develop solutions regarding aquatic nuisance species based on field needs
Aquatic Nuisance Species Research Program

- **Authorization:**
  - Non-indigenous Aquatic Nuisance Prevention & Control Act, 1990
    - Zebra Mussel Research Program (1990-1995)
  - National Invasive Species Act, 1996

- **Primary R&D program to address aquatic invasive species that impact navigable waters, infrastructure and associated water resource projects**

- **Funding Source:** O&M

- **Research Requirements:** Generated by USACE-HQ, Corps’ Invasive Species Leadership Team, Environmental SONs

- **Current Focus Areas:** invasive fish and mussels
Funding History
Aquatic Nuisance Species Research Program (O&M)
Authorization: $3 Million
Funded R&D Projects in FY15

FY15 Budget: 668K
FY16 Budget: 675K

ANSRP Review: February, 2015

1. Predicting Ecological Invasion and Assessing Risks for Dreissenid Mussels (FY13-15)
2. Update of the Zebra Mussel Chemical Control Guide (FY14-15)
3. Development of Electrical Control Methods for Zebra and Quagga Mussels (FY14-16)
4. Efficacy of Barriers to Prevent Passage of Freshwater Invasive Fish Species (FY14-17)
Aquatic Plant Control Research Program

- Authorization:
  - River and Harbor Act (Section 104), 1958, as amended
  - Only federally authorized R&D program for aquatic plant management

- Develops effective, economical, and environmentally compatible strategies for identifying, assessing, and managing invasive aquatic plant problems

- Funding Source: CG

- Research Requirements: Generated by USACE-HQ, Corps’ Invasive Species Leadership Team, Environmental SONs

- Current Focus Areas:
  - Biological Control
  - Chemical Control
  - Ecological Assessment
  - Management Strategies & Applications
Aquatic Plant Control Research Program
FY15 Budget: $4M
FY16 Budget: $0

APCRP Review: November 2014

FY15 Projects:

Biological Control
1. Identification of New Biocontrol Agents
   ▪ Surveys in China, S. Korea for new hydrilla insects – USDA-ARS
   ▪ In country surveys for flowering rush pathogens
2. Applied Use of Plant Pathogens as Biocontrol Agents
3. Applied Use of Insects as Biocontrol Agents
4. Development of Insect Biocontrols for *Phragmites* and Flowering Rush
   ▪ Surveys in Europe - CABI
5. Improving Biological Control of *Salvinia molesta* and *S. minima*
Aquatic Plant Control Research Program
FY15 Projects

Chemical Control
1. Evaluating Grass-specific Herbicides to Enhance Aquatic Restoration Projects
2. Linking Plant Biology with Management Strategies to Improve Control of Monoecious Hydrilla (partnering with GLRI, LRB)
3. Evaluation of New Herbicide Techniques for Management of Giant Salvinia
4. Biology & Management of Crested Floating Heart
5. Biology & Management of Invasive *Ludwigia* species in California and Florida
6. Improving Chemical Control of Flowering Rush Using Phenological Weak Points
Aquatic Plant Control Research Program
FY15 Projects

Ecological Assessment
1. Seasonal Ecology and Wetland Natural Enemy-Plant Interactions
2. Ecological Habitat Model forIntroduced Seagrass, *Zostera japonica*, on Pacific Coast

Management Applications & Strategies
1. Development of a Real-time Acoustic-based SAV Detector-Herbicide Dispensing System
3. Economic & Environmental Benefits of Invasive Aquatic Plant Management
4. Reducing Eutrophication and the Prevelence of HAB’s
5. Physicochemical Treatment of HABs and Microtoxins using Hydrodynamic Cavitation and Advanced Oxidation
6. Aquatic Vegetation Assessment for Cerillos & Portuguese Reservoirs
Successful R&D Solution

**Problem:** Development of herbicide resistance; loss of management tools
- Fluridone-resistant hydrilla populations dominate FL waterbodies
- Fluridone-resistant hybrid milfoil in MI
- Reduced tolerance of hydrilla to endothall

**Solution:**
- Developed predictive screening tools for detecting/monitoring herbicide resistance
- Developed new use patterns for existing herbicides
- Collaboration with USEPA to develop new herbicide tools; new modes of action
- Developed BMP guidance for managing and preventing herbicide resistance

**Benefits:**
- Ensures efficient use of viable management strategies
- Rapid assessment of resistant populations
- Established USACE as the lead agency for herbicide resistance in aquatic plants
- Reduced management costs
Successful R&D Solution

**Problem:** Monoecious hydrilla is expanding in northern U.S.
- Recent discovery in high-profile areas: Lake Cayuga Inlet, Erie Canal, Ohio River
- Limited information on biology, ecology and effective management options

**Solution:**
- Utilize capabilities on aquatic herbicides/application strategies developed in APCRP to eradicate hydrilla from the Erie Canal/Tonawanda Creek
  - 2014 Treatments reduced hydrilla tuber densities >90%
  - Hydrilla biomass reduced 100% at 4 sample sites
  - Follow-up 2015 herbicide treatments
- Organized a Symposium on Biology & Management for Monoecious Hydrilla
  - APCRP Technical Note: “Establishing Research and Management Priorities for Monoecious Hydrilla”
- Ongoing APCRP-funded R&D
  - Identify effective biocontrol agents
  - Improved treatment strategies using herbicides

**Benefits:**
- Established USACE as lead of interagency collaboration on solving
  - Buffalo District and ERDC-EL partnership
  - Public Outreach – positive
  - “Army Corps seeks to avoid spread of invasive hydrilla plant”
- Collaboration among agencies to solve problem
- Additional funding to expand R&D - GLRI
  - Great Lakes specific Risk Assessment
  - Plant Biology and Phenology
Successful R&D Solution

- **Problem:** Alligatorweed expansion on CE projects throughout the U.S.; hinders navigation, clogs water intakes, disrupts water flow, outcompetes native vegetation.

- **Solution & Benefits:**
  
  - Developed an effective insect biocontrol agent: alligatorweed flea beetle
  
  - Insect release significantly reduced plant populations; reduced cost of herbicide use by 75%; restored function

  - Annual field collection/distribution program
    
    - Partner with the SAJ Aquatic Plant Control Operations Support Center
    
    - FY15 – flea beetles (>100,000) shipped to federal, state and county agencies in 8 states
Successful R&D Solution

- **Problem:** Movement of Asian carp species; effective operation of the CSSC electric barriers is critical to prevent dispersal into Great Lakes

- **Solution:**
  - Identified swim performance and burst speeds of Asian carp species; different ages
  - Determined effect of varying environmental conditions (water temperature, conductivity, and velocity) on barrier performance
  - Data used to optimize electric barrier operating parameters for immobilizing Asian carp

- **Benefits:**
  - Refinement operating parameters under varying seasonal environmental conditions
  - Inform future dispersal barrier design and operation
APCRP & ANSRP Technology Transfer

Summary of FY14 Products

>2.7M Website Hits
7 Conferences & Workshops Attended
12 Technical Reports, Technical Notes
14 Journal Articles, 2 Book Chapters
1 Hosted Workshop on HAB
12 University Collaborations
22 Federal, State, and Other Stakeholder Collaborations
8 International Collaborations
19 USACE District Collaborations
7 Webinars; > 150 Participants
> 76,000 alligatorweed flea beetles distributed to 21 agencies

52 R&D Facility Tours
Get involved…
Submit a “Statement of Need” for R&D

http://cw-environment.usace.army.mil/needs.cfm?CoP=Env
Writing a Statement of Need (SON)

- Use the SON template
- Clearly identify the problem and impact to USACE Mission
- Identify extent of the problem; national or regional focus carries more weight
- Identify yourself – USACE POC, provide contact information
- Identify expected outcome/product if possible (e.g., report, BMP, database, model, tool, etc.)
- Review the list of “Existing/Archived SONs”
SON Review Process

Environmental SON

EL Technical Directors Office – Civil Works

eRARG - EMRRP

Invasive Species Leadership Team & Research Review Group

Other Business Line TD
- Navigation
- Flood & Coastal

Rank and Prioritize SONs

Proposal & Funding
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