

# Adapting Annually: Establishing a Rhythm for Flow Actions to Benefit Delta smelt

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# Delta Smelt and Adaptive Management

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## Challenges:

- Short-life cycle – a lot can go wrong quickly
- Gaps in knowledge, e.g., spawning, movement
- Very limited detection

## Opportunities:

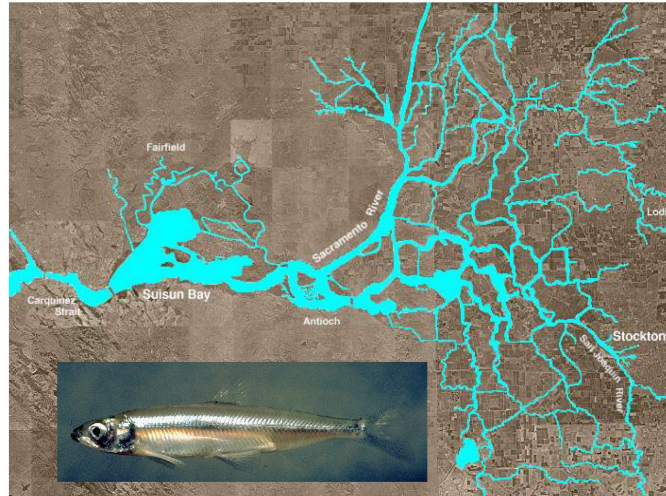
- Deployment of cultured fish to increase understanding
- Ongoing research on foodweb
- Multiple management actions being planned and implemented

# Science Plan to Assess the Effects of Ambient Environmental Conditions and Flow-Related Management Actions on Delta Smelt

## Focus

- Increased understanding of mechanisms by which abiotic and biotic conditions affect Delta Smelt including the role of ambient conditions and flow-related management actions.

Science Plan to Assess the Effects of Ambient Environmental Conditions and Flow-Related Management Actions on Delta Smelt



The image shows an aerial photograph of the Sacramento-San Joaquin River Delta. The waterways are highlighted in a bright cyan color. Key locations labeled include Fairfield, Suisun Bay, Antioch, Stockton, and Lodi. The Sacramento River and San Joaquin River are clearly visible. In the bottom left corner of the map area, there is a small inset photograph of a Delta Smelt fish, showing its characteristic silver body and dark lateral stripe.

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For  
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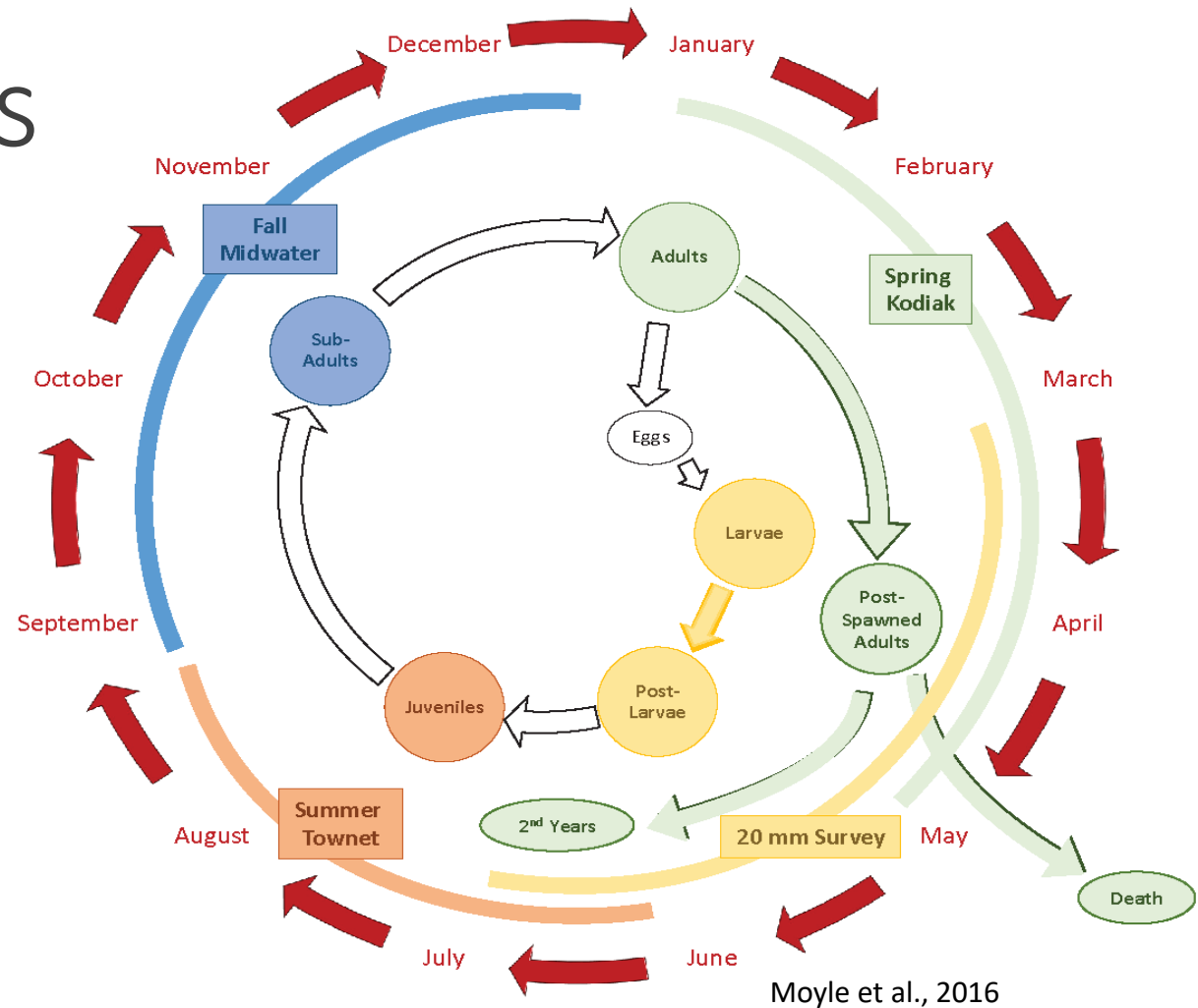
# Flow-Related Management Actions

Examples:

- North Delta Foodweb
- Operation of Suisun Gates
- Summer-Fall Habitat

Specifics vary from year to year

Antecedent conditions, e.g., warm summer, can influence outcomes



# Annual Decisions on Management

Year Type	Suisun Gates	Yolo Bypass Flow Pulse	Flood and Drain Managed Wetlands	Roaring River	Outflow Augmentation (Spr/Summ)	Fall Outflow action	Ambient Conditions
Wet			X	X		X	X
Above Normal		X	X	X	X	X	X
Below Normal	X	X	X	X	X		X
Dry	X	X	X	X	X		X
Critical			X	X			X

# Using Science in Adaptive Management

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Need to ***predict***, in advance, the consequences of taking a management action

Surveys and monitoring are used to ***detect*** change in the natural system.

Increased ***understanding*** and building an expanded knowledge base so that future actions can be planned and implemented

# Science in Support of Delta Smelt

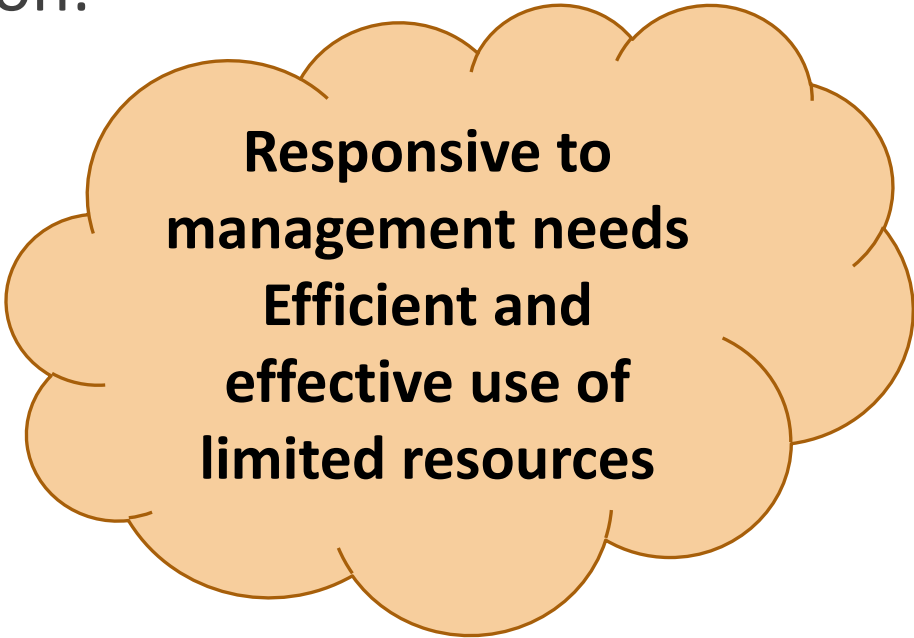
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Generates timely, usable information:

- Data products
- Synthesis reports
- Model predictions
- Knowledge 'updates'

Uses best practices

- QA/QC
- Open data
- Data management/archiving
- Peer review



**Responsive to  
management needs  
Efficient and  
effective use of  
limited resources**

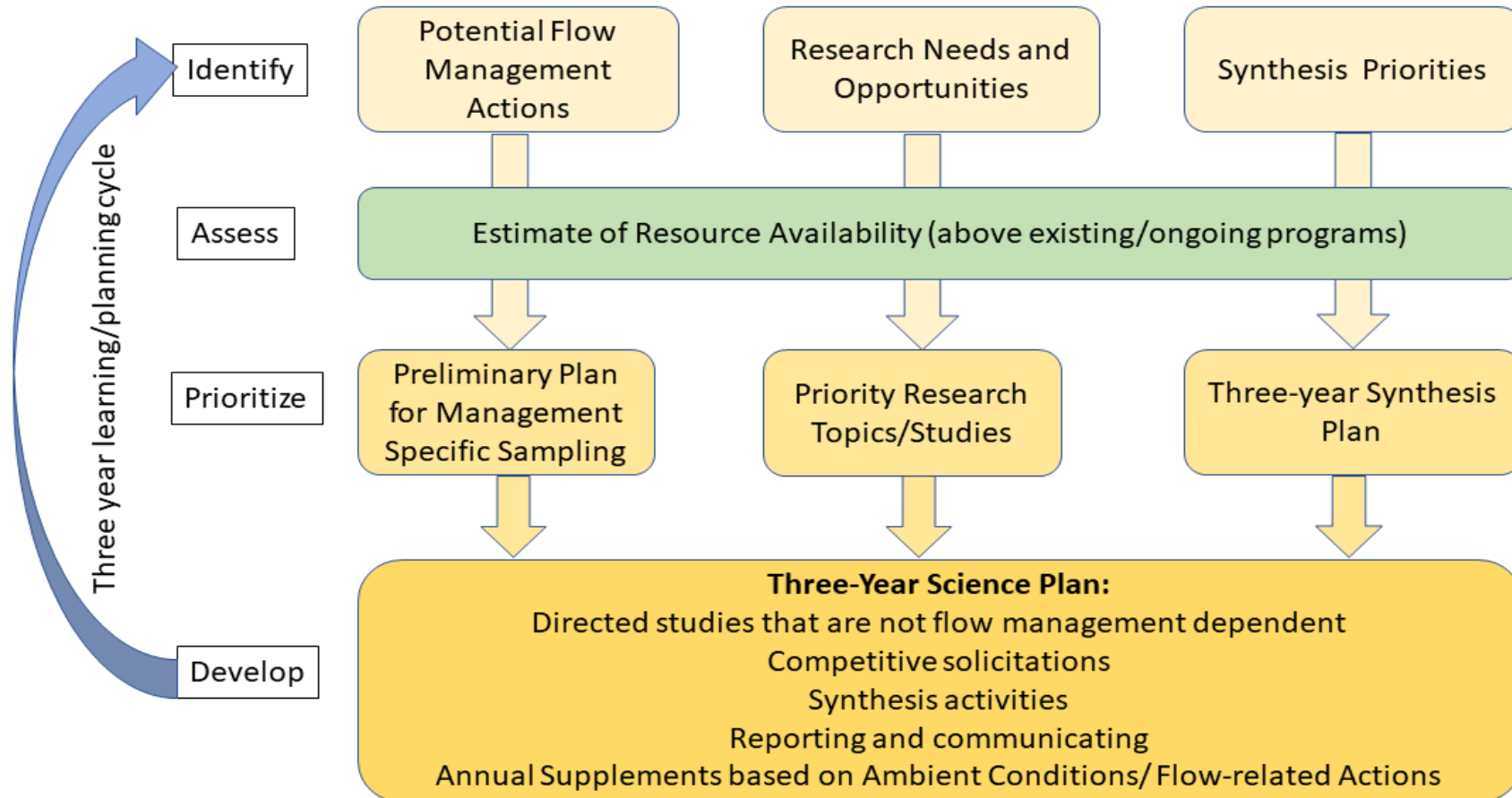
# Programmatic Approach

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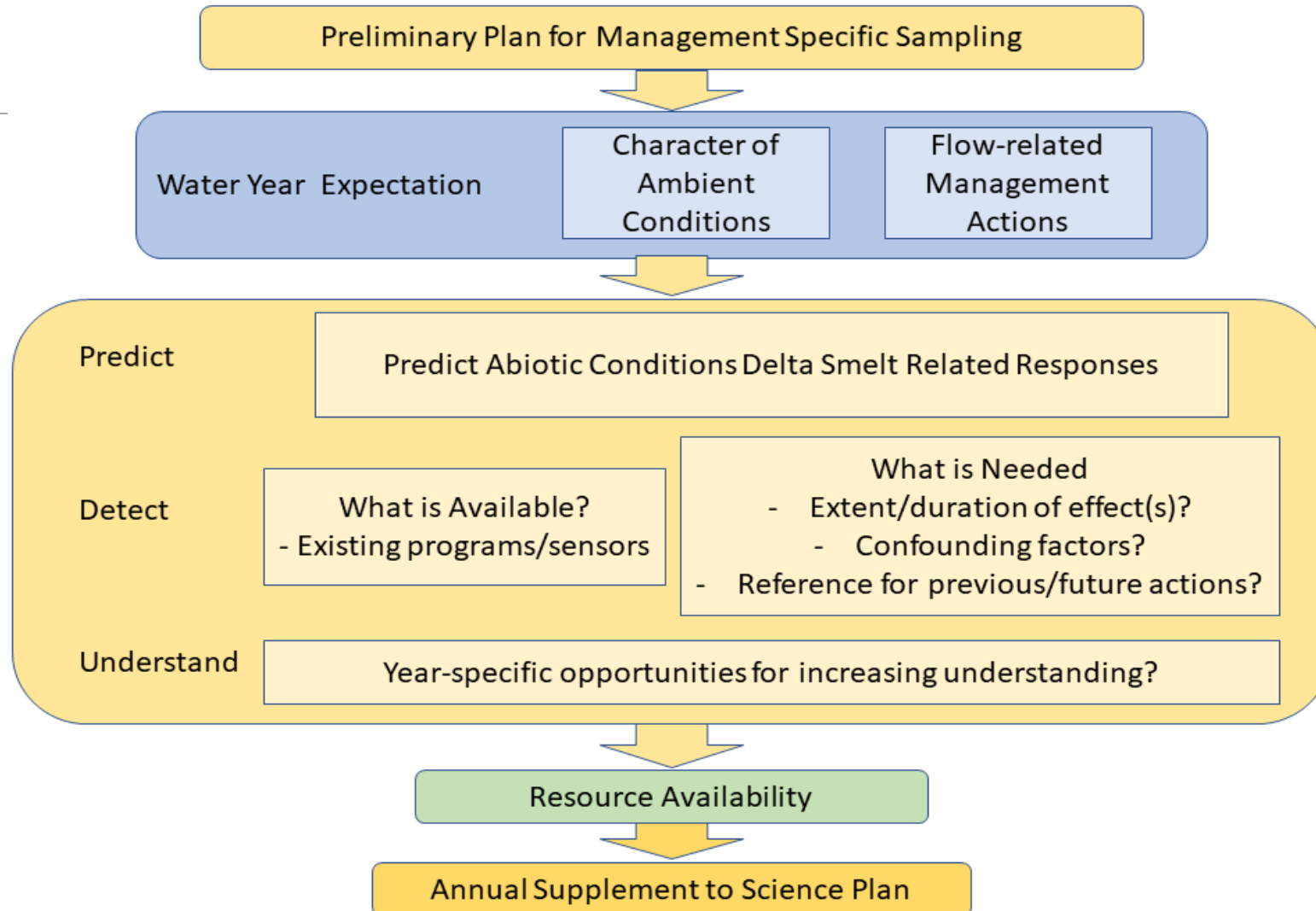
- Three-year Science Plan developed on the basis of:
  - Proposed management actions
  - Research Needs and Opportunities
  - Synthesis Priorities
- Annual Supplements:
  - Preliminary Plan for management action specific sampling
  - Water year expectations
  - Need/Opportunity to Predict, Detect and Understand
  - Resource Availability



# Three-Year Science Plan



# Annual Supplement



# Annual Planning

**October -  
December**

- Outline potential year-specific flow management actions
- Identify relevant ongoing monitoring/research studies
- Determine level of resources available

**January -  
March**

- Predict potential extent/duration of effects
- Assess monitoring needs beyond ongoing programs. Important areas/topics? Opportunities to learn?
- Estimate resource needs and iterate

**April**

- Develop plan
- Present to decision makers
- Refine, finalize and disseminate

**Execute**

Communication

# Implementation Challenges

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- Tough to learn from year to year
  - Sample processing
  - Making sense of the data takes time
- Requires intense coordination and communication
  - Scientists and managers
  - Flow management actions are just some of the moving parts everyone is dealing with
- Resources required for action-specific monitoring/learning

# What Could Help?

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- Dedicated staffing
  - Someone whose job it is to track information generated, potential management actions, etc.
- Process-based predictive tools
  - Improved predictions in advance of actions
  - Comparison to 'no-action' conditions
- 'Detecting effects' in different ways
  - Less specific information but available more quickly



# QUESTIONS?