

US EPA ARCHIVE DOCUMENT



Critical Elements: Progress Since Review

**Tom Danielson
Dave Courtemanch
Maine DEP**

Critical Element Review

- **1-day reviewed – June 2006**
- **Streams & Rivers - Level 3 (94%)**
- **Recommendations**
 - Increase spatial density and amount of sample locations
 - Add second biological assemblage
 - Improve diagnostic capabilities
 - Improve better integration of data
- **Wetlands – Level 2 (76%)**

Critical Elements

1. Index Period
2. Spatial Coverage
3. Natural Classification
4. Criteria for Refinement
5. Refinement
6. Data Collection
7. Data Processing
8. Data Management
9. Ecological Attributes
10. Biological Endpoints and Thresholds
11. Diagnostic Capabilities
12. Professional Review and Documentation

Major progress: biocriteria for
second assemblage: algae

Critical Elements

1. Index Period
2. Spatial Coverage
3. Natural Classification
4. Criteria for Reference Streams
5. Reference Conditions
6. Taxonomic Resolution
7. Sample Collection
8. Sample Processing
9. Data Management
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Environmental Assessment and Geographic Database (EGAD)

- **New DEP database that stores all sampling data for departmental programs**
 - **Water quality (streams, lakes, wetlands,marine)**
 - macroinvertebrates, algae, fish, fish tissue
 - Chemistry, habitat, landscape
 - **Groundwater quality**
 - **Air Quality**
 - **Chemical spills, remediation, and Superfund**
- **12 million records – 105 users and growing**

Benefits of EGAD

- **Improves data consistency**
 - Same data format
 - Same parameters
- **Facilitates data exchange.**
- **Allows us to ask more complex, interdisciplinary questions.**
- **Permission settings prevent accidental or “unauthorized” data changes.**




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Friday, March 21, 2008

RIVER AND STREAM MONITORING

- River/Stream Monitoring Home
- Atlantic salmon rivers
- Biomonitoring**
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 - Materials
 - Sampling
 - Why
- Dioxin
- Modeling & data reports
- Stream studies

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Biomonitoring

- ☐ [Contacts](#). Who to contact for more information.
- ☐ [History](#). Short history of our program.
- ☐ [Maps and Data](#). Find sampling locations and review data.
- ☐ [Materials](#). Reports, publications, SOPs and other quality assurance materials, etc.
- ☐ [Sampling and analysis](#). Overview, field methods, data analysis methods, and descriptions of algae and macroinvertebrates.
- ☐ [Why biological monitoring?](#) Importance of biological monitoring and assessments.

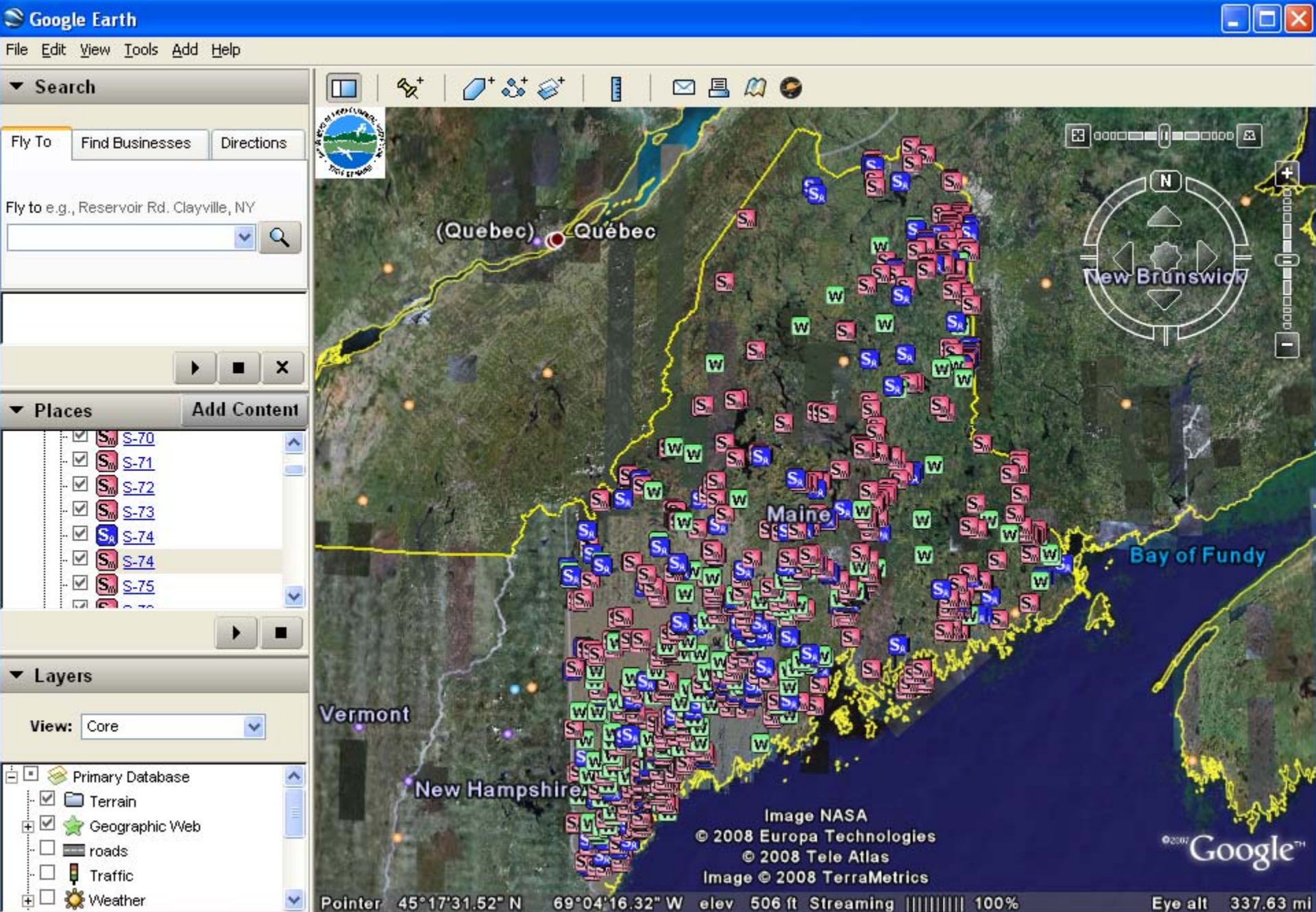
Introduction

The Maine DEP's Biological Monitoring Program assesses the health of rivers, streams, and wetlands by evaluating the composition of resident [aquatic benthic macroinvertebrate](#) and algal communities. The Biological Monitoring Program can tell how healthy the waterbody is based on the amount and types of aquatic macroinvertebrates and [algae](#) living in a waterbody. The amount and types of macroinvertebrates and algae living there change when waterbodies are polluted or disturbed. For example, a polluted stream will often lack pollution-sensitive organisms like mayflies and stoneflies and will have more pollution-tolerant organisms like snails and leaches.

The Biological Monitoring Program uses their sampling results to inform a variety of management activities, such as:

- Determining if waterbodies are attaining environmental goals (criteria) associated with Class AA, A, B, and C waterbodies





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Layers

View: Core

- ☒ Primary Database
- ☒ Terrain
- ☒ Geographic Web
- ☐ roads
- ☐ Traffic
- ☐ Weather
- ☐ 3D Buildings
- ☒ Borders and Labels



Site ID	Date	Status	Action
1506	9/21/2005	No	View
1539	8/7/2006	No	View
1629	8/7/2007	n/a	

DOWNSTREAM PHOTO
2007 downstream site photo



UPSTREAM PHOTO
2007 upstream site photo



Whitefield

Google

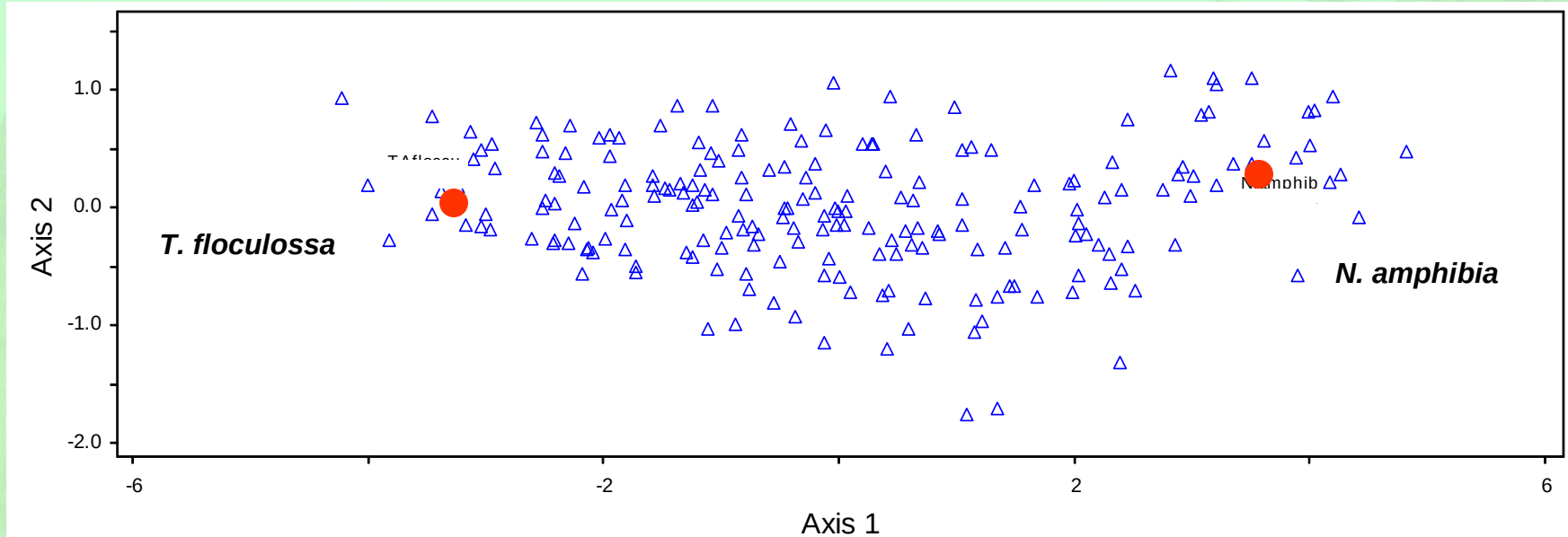
Critical Elements

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Progress Developing Diagnostic Capabilities

- **Urban Stream TMDLs (5 streams)**
 - Multi-disciplinary Stressor ID process
 - % Impervious Cover TMDL based on biological and physical-chemical data
- **Developmental planning: inference models for stream benthic macroinvertebrates**

PCA Ordination Identified Major Pattern in Species Optima



- Axis 1 (“urbanization suite”) represents 86% of variance
- Rescaled axis to 1 (most sensitive) to 100

TALU Milestones

Milestone 1. Establish Conceptual Foundation

- Establish an interdisciplinary, collaborative approach to the development of tiered uses (ecological, technical, and legal)
- Identify and acquire appropriate staff and management expertise

Milestone 2. Merge Scientific & Policy Foundations

- Link management objectives with technical program
- Evaluate for consistency with existing water quality standards framework
- Draft or refine narrative aquatic life use descriptions

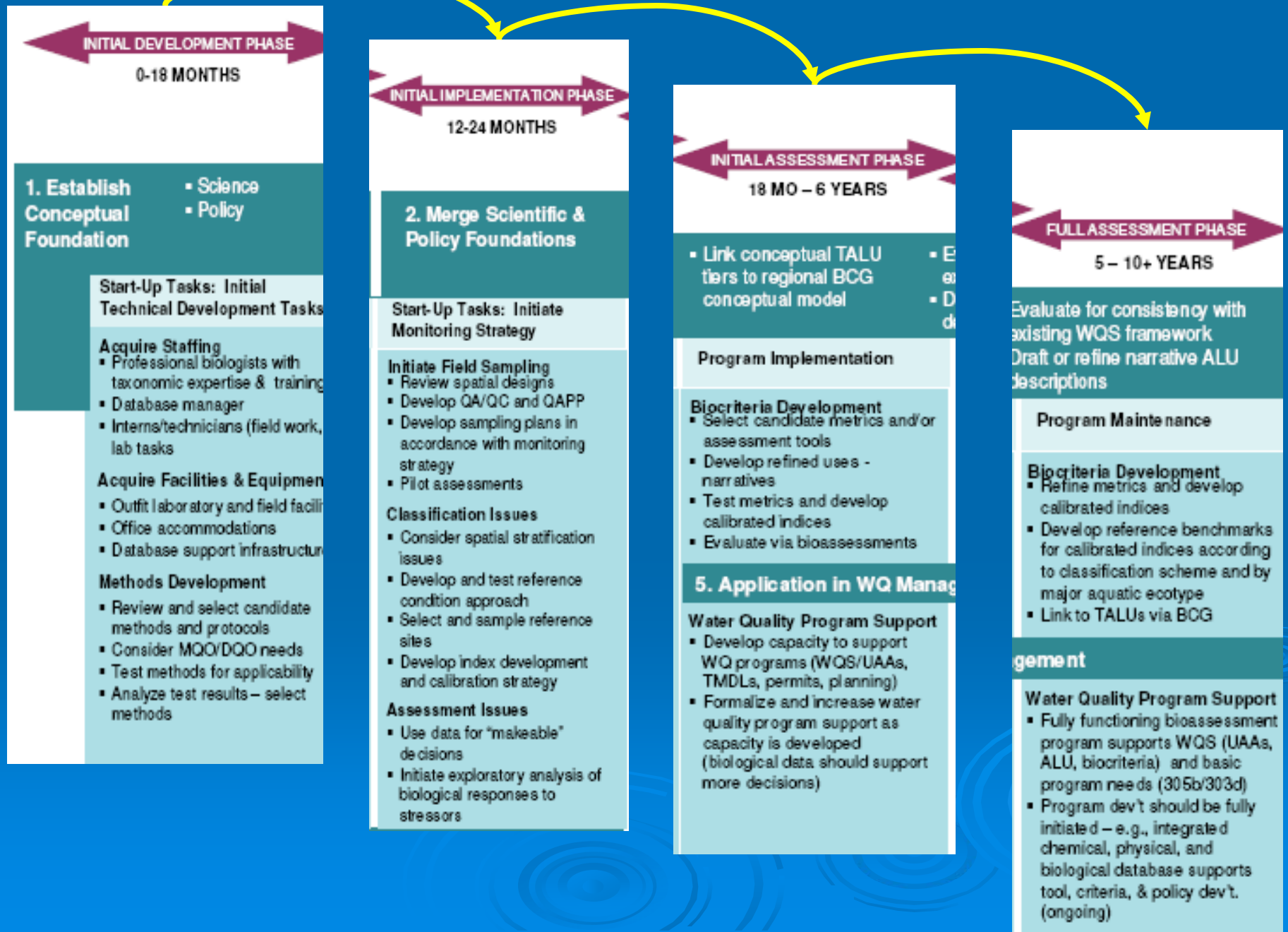
Milestone 3. Establish Monitoring Program

- Develop methods and monitoring design, establish reference conditions, build baseline database and database management system
- Logistics: staffing, facilities, and equipment

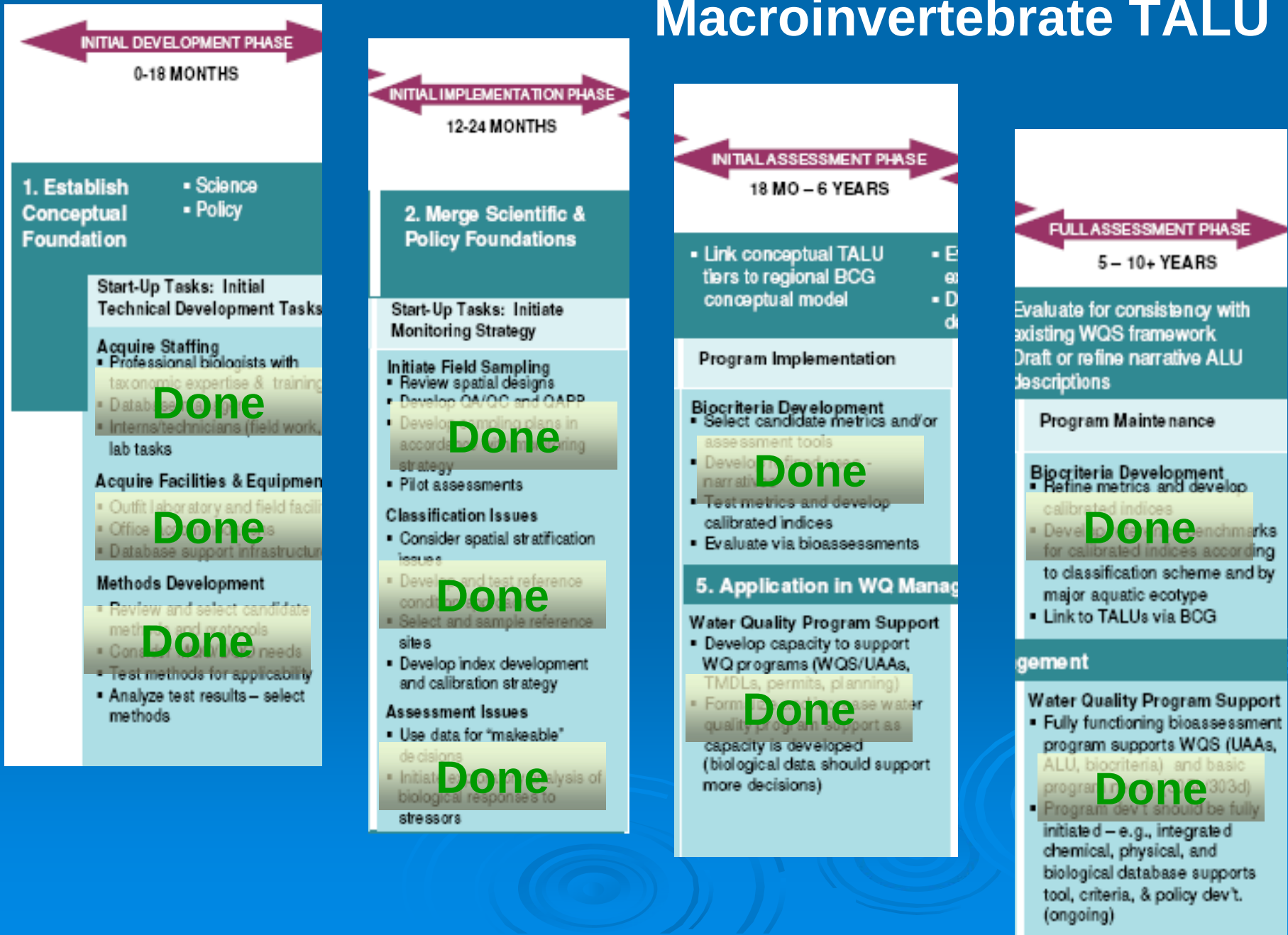
Milestone 4. Develop/Validate Quantitative Thresholds

- Program implementation: develop biocriteria and water quality program support (initiating the process of using TALUs and biological assessments to support water quality management tasks)
- Validate the accuracy of ecological expectations with empirical data
- Program maintenance: refine biocriteria and maintain water quality program support (maintaining the process of using TALUs and biological assessments including the continuous evaluation of tools, criteria, and processes based on what is being learned via a systematic approach to monitoring and assessment; includes expansion to other aquatic ecotypes)

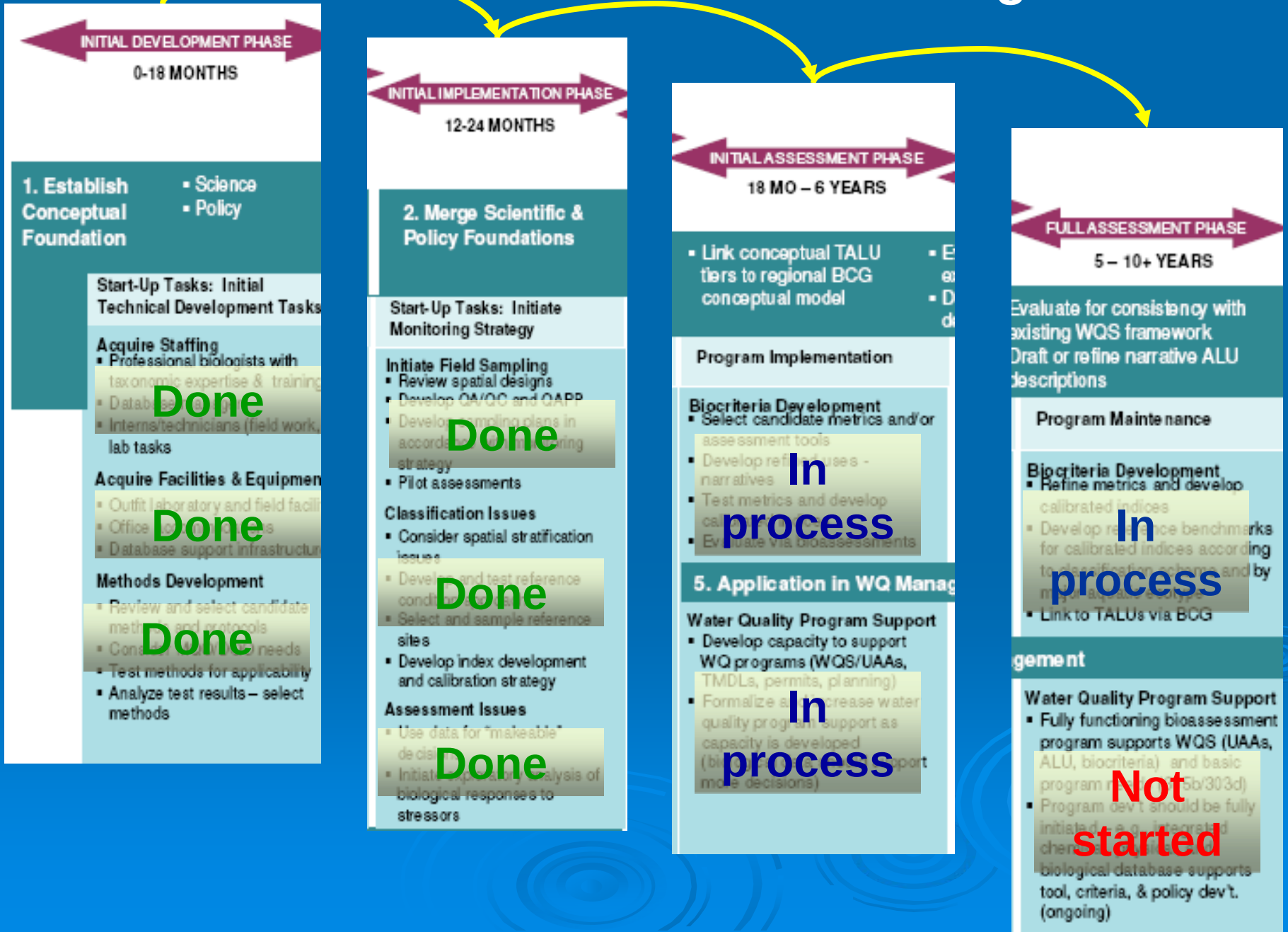
Minnesota's TALU Timeline Status



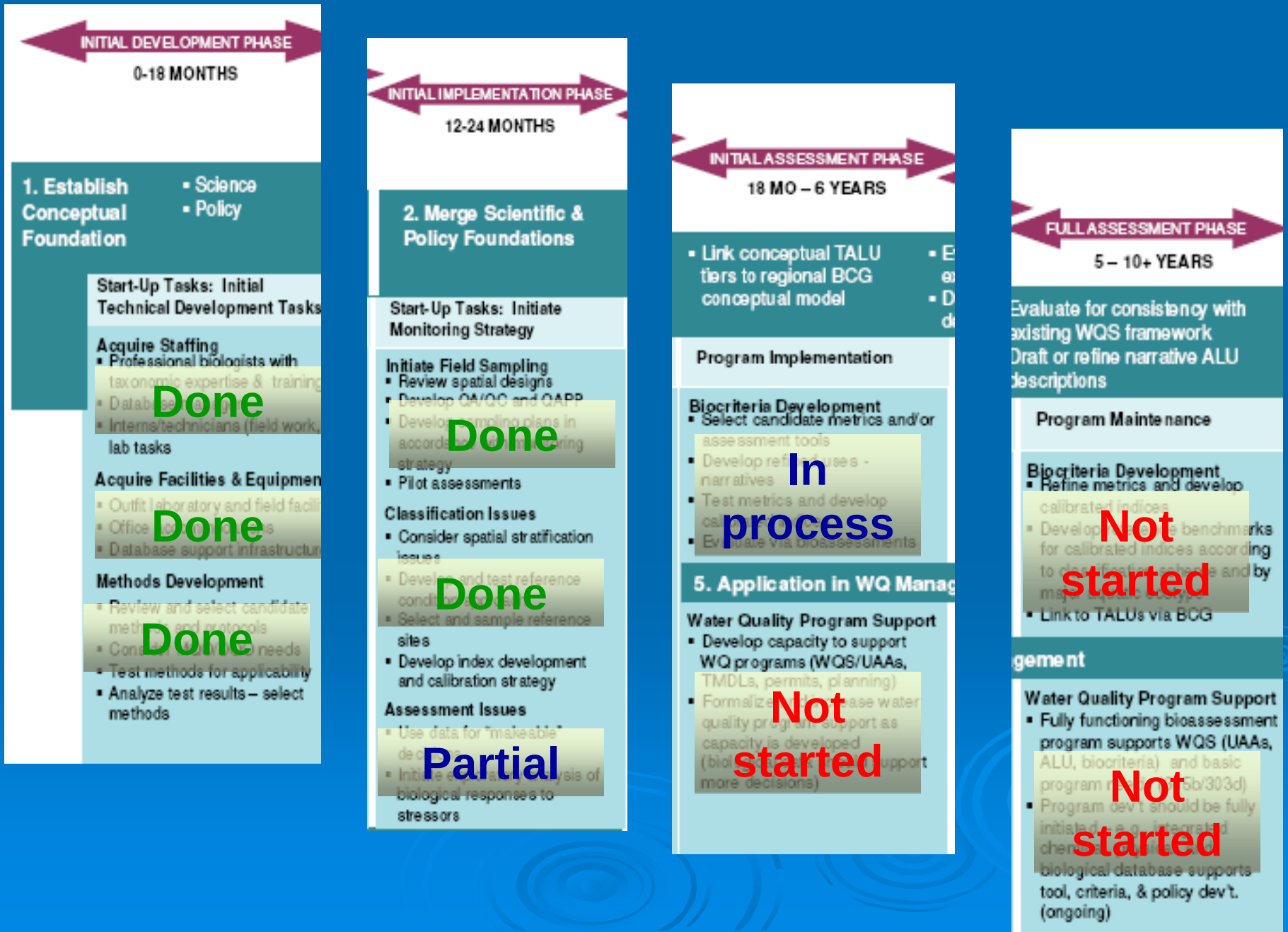
Maine River-Stream Macroinvertebrate TALU



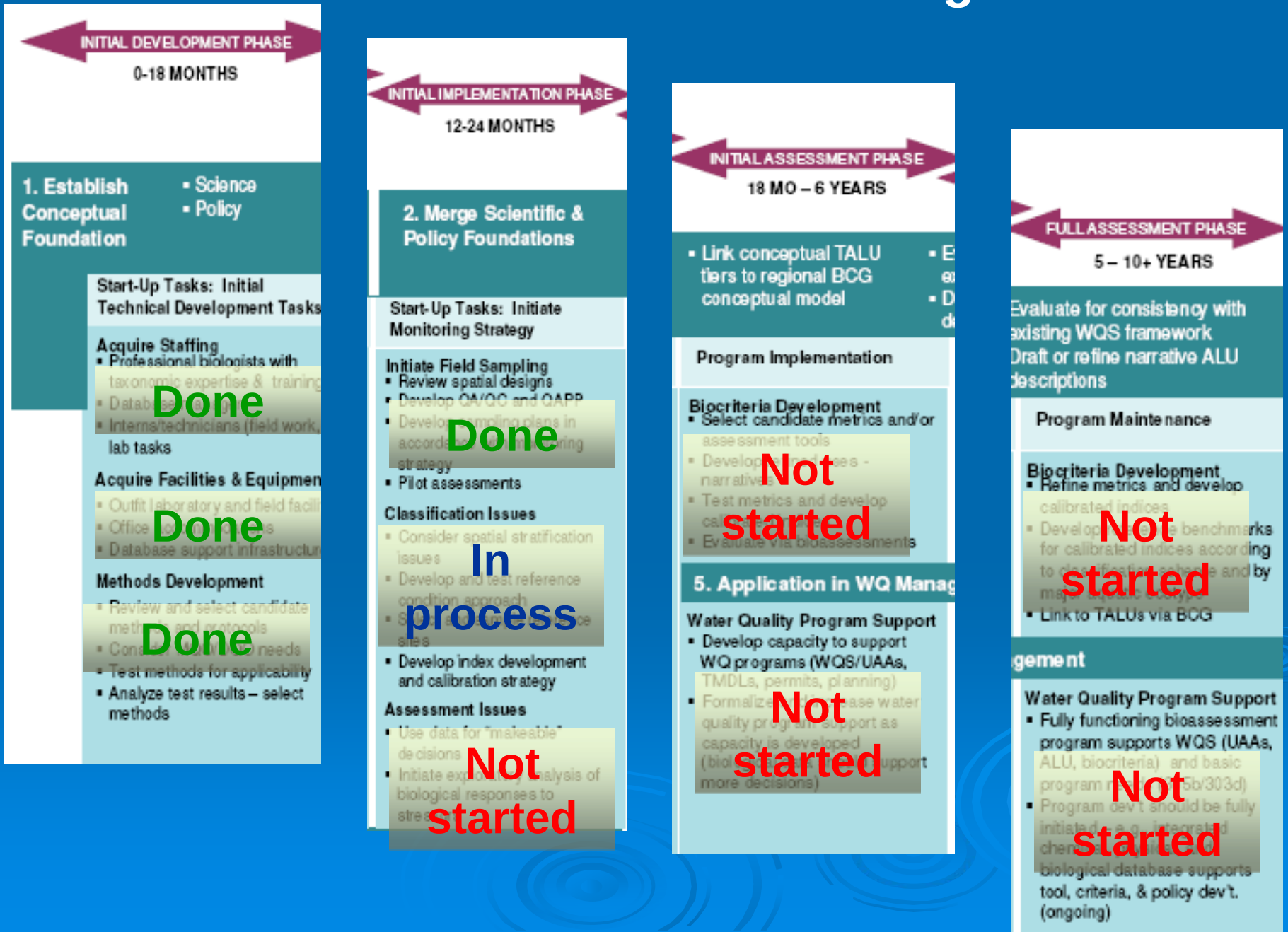
Maine Stream Algae TALU



Maine Wetland Macroinvertebrate TALU

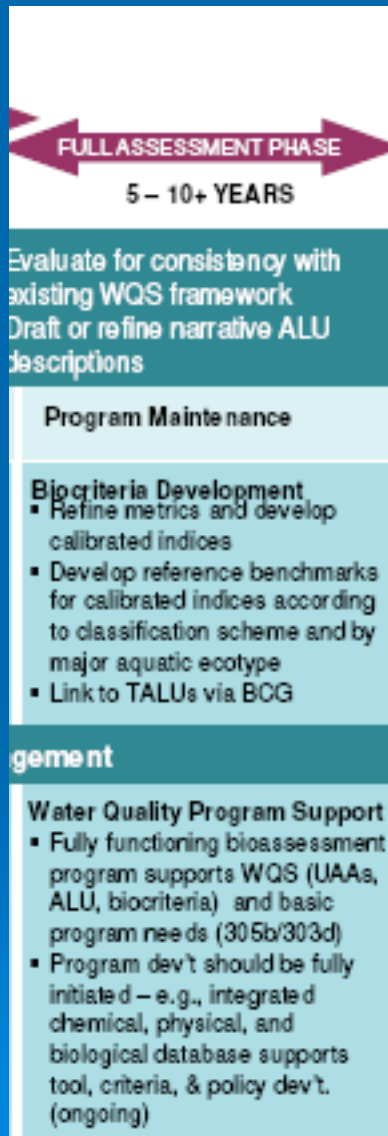


Maine Wetland Algae TALU



Maine River-Stream Macroinvertebrate TALU

“Program Maintenance”



LDM re-calibrated with new data in 1998 (due for re-calibration again)

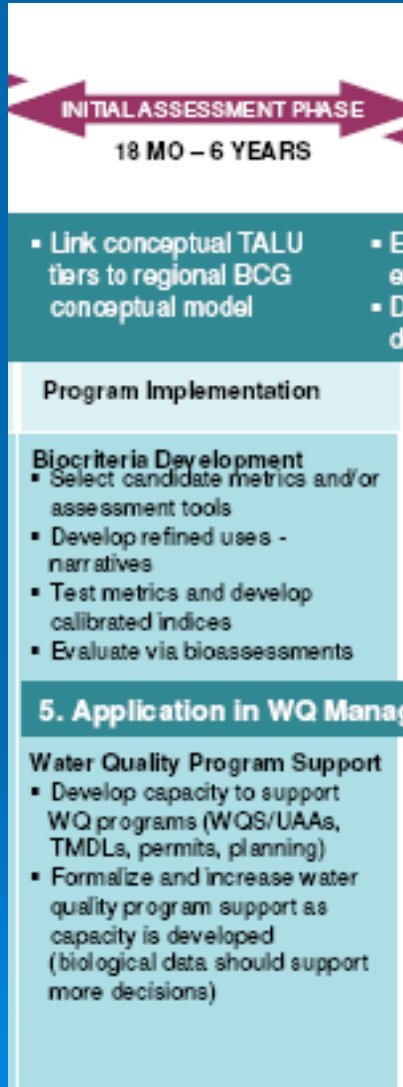
LDM fully linked to TALU's via BCG

TALU-BCG drives innovative, biologically-based TMDLs, WQ ReClass, determines need for, design of UAAs

TALU-BCG used to develop new biologically-based criteria: instream flow; nutrient criteria, etc

Maine Stream Algae TALU

"Program Implementation"



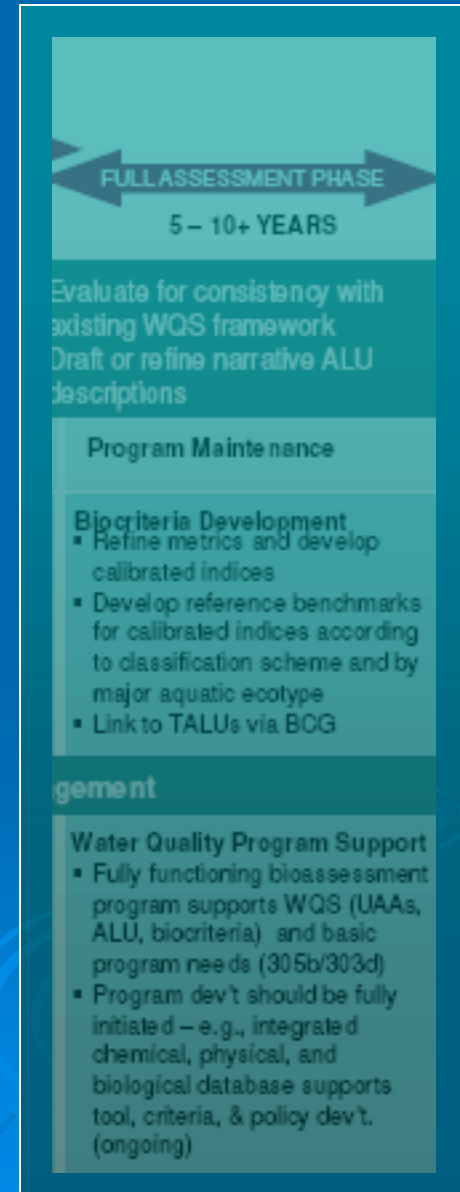
Conceptual linkage to invertebrate program & TALU via BCG is completed

Refined use narrative in place for 2nd assemblage

Metric selection and validation complete

Algal data used to develop nutrient criteria rule

In process: formal rule development for 2nd assemblage



Maine' Wetland Macroinvertebrate TALU

"Program Implementation"

Baseline wetland database(10 years); QAPP complete

Classification and reference condition issues addressed (wetland types; ecoregions)

In process: metric selection and validation

Used in permitting & mgmnt decisions (BPJ)

INITIAL IMPLEMENTATION PHASE

12-24 MONTHS

2. Merge Scientific & Policy Foundations

Start-Up Tasks: Initiate Monitoring Strategy

- Initiate Field Sampling
 - Review spatial designs
 - Develop QA/QC and QAPP
 - Develop sampling plans in accordance with monitoring strategy
 - Pilot assessments

Classification Issues

- Consider spatial stratification issues
- Develop and test reference condition approach
- Select and sample reference sites
- Develop index development and calibration strategy

Assessment Issues

- Use data for "makeable" decisions
- Initiate exploratory analysis of biological responses to stressors

INITIAL ASSESSMENT PHASE

18 MO – 6 YEARS

- Link conceptual TALU tiers to regional BCG conceptual model
- Evaluate for consistency with existing WQS framework
- Draft or refine narrative ALU descriptions

Program Implementation

Biocriteria Development

- Select candidate metrics and/or assessment tools
- Develop refined uses - narratives
- Test metrics and develop calibrated indices
- Evaluate via bioassessments

5. Application in WQ Management

Water Quality Program Support

- Develop capacity to support WQ programs (WQS/UAA's, TMDLs, permits, planning)
- Formalize and increase water quality program support as capacity is developed (biological data should support more decisions)

FULL ASSESSMENT PHASE

5 – 10+ YEARS

Evaluate for consistency with existing WQS framework
Draft or refine narrative ALU descriptions

Program Maintenance

Biocriteria Development

- Refine metrics and develop calibrated indices
- Develop reference benchmarks for calibrated indices according to classification scheme and by major aquatic ecotype
- Link to TALUs via BCG

Water Quality Program Support

Water Quality Program Support

- Fully functioning bioassessment program supports WQS (UAA's, ALU, biocriteria) and basic program needs (305b/303d)
- Program dev't should be fully initiated – e.g., integrated chemical, physical, and biological database supports tool, criteria, & policy dev't. (ongoing)

Maine Wetland Algae TALU

