ECOSYSTEM

INDICATOR 9

"Percent of assessed rivers and estuaries with healthy aquatic communities."

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SCREENING RESULTS: Overview

Determining the health of aquatic communities typically involves the assessment of some or all aspects of fish, macro-invertebrate, and algae populations, as well as habitat, and a variety of other chemical and physical factors. EPA, in cooperation with several state programs and others, has developed guidance to help states in conducting aquatic biological assessments. One such guidance is the Rapid Bioassessment Protocol (RBP). This document and its associated guidance and revisions, attempts to consolidate information on various aquatic community assessment protocols for use by states. EPA and several states have been working towards incorporating more biological assessment into state water quality assessments, particularly the determination of aquatic life use support in 305(b) reports. In most cases, the incorporation of extensive biological assessment for determining aquatic health in state water quality assessment programs is in its infancy. Some states have included biological parameters in determining aquatic health for a portion of their assessed waters, some with long histories of biological data. Still, a relatively small proportion of aquatic health determinations are made using "comprehensive" biological assessment.

As in most states, it is clear that comprehensive aquatic community assessments are not widespread in New England. Assessments are neither comprehensive in the coverage of significantly representative sets of waters assessed using biological criteria, nor in the utilization of multiple biological criteria in particular assessments (e.g., fish, macro invertebrate, algae, and habitat). Several states have however been expanding their biological assessment efforts, and utilize the relatively small amount of information gathered in preparing their 305(b) assessments.

Since the 1970s, Maine has been building a database of benthic macro invertebrate data. This data covers approximately 300 miles of waterway, and has been used since 1986 in making aquatic life use assessments based on biocriteria defined by the state in describing water quality criteria. The approximately 200 sites used during the course of this program to collect samples include reference and pristine sites, as well as sites downstream of specific pollution sources. Vermont has also maintained a biological sampling program for many years. Both fish and macro invertebrate community data is used to help in making 305(b) aquatic life use determinations, and in establishing a state fish community index of biotic integrity and macro invertebrate metrics. Over 1,000 miles of waterway have been assessed in Vermont using aquatic community assessment methods. Connecticut, Massachusetts, and Rhode Island have each included macro invertebrate community data in making aquatic life use assessments for small proportions and those states' waters respectively. Each of these states has assessed approximately 300 miles of their waterways using aquatic community data. New Hampshire has an aquatic biological monitoring program in its early years, and is currently working to establish baseline data. Macro invertebrate and fish population data has been collected at a number of sites throughout the state, but assessments have not been formally made. See the individual interview results for more detail on differences among state programs.

Another challenge to the support of this indicator is the consistent definition of a healthy aquatic community. Some states have incorporated aquatic community criteria into state standards for aquatic health. These are comprised of narrative and numeric criteria, dependent upon multiple

indices using biological data (e.g., the IBI), but often include other aquatic health factors. Many of these indices and aquatic community assessments are based on reference conditions specific to each waterbody and to the state-specific definitions and criteria. States utilize unique aggregates of indices in making some aquatic life use support determinations for state 305(b) reports. Biological criteria do not comprise the sum of information used in making aquatic life use determinations, nor do all aquatic life use determinations utilize some biological data. If the indicator is supported by actual biological community indices (e.g., the IBI), determining values to equate with "healthy aquatic communities" will be required.

SCREENING RESULTS: Summary Matrix

(see results of individual interviews in next section for more detail)

State/Entity	Database	Coverage			Quality/ Methodology	Availability
		Waters	Parameters	Temporal		
EPA - NE	none, other than what is included in state 305(b) assessments	n/a	n/a	n/a	n/a	n/a
Connecticut	CT DEP collects some biological monitoring data for use in 305(b)	small proportion of total waters; approximately 300 miles have been assessed	macro invertebrate community indices; biocriteria defined in state water quality standards	data since 1973; biological data used in 305(b) assessments since 1988	RBP, standard sampling, etc.; macro invertebrates and some fish population data are utilized	CT DEP collects this data; some data is used in preparing the state's 305(b)
Maine	ME DEP maintains a database of macro-invertebrate data, and uses this to support 305(b) assessments	small proportion of total waters; approximately 300 miles have been assessed; this includes reference, pristine, and problem sites	macro invertebrate community indices; biocriteria defined in state water quality standards	data since 1970s; biological data used in 305(b) assessments since 1986	standard sampling, etc.; numerous indices and models are used in making assessments	electronic database of macro invertebrate data; some data is used in preparing the state's 305(b)
Massachusetts	MA DEP collects some biological monitoring data for use in 305(b)	small proportion of total waters; approximately 300 miles have been assessed on a rotating schedule; this mostly includes problem sites	macro invertebrate community indices and other criteria; biocriteria defined in state water quality standards	DEP collects data on an ongoing basis; biennial 305(b) reporting	standard sampling, etc.; modified RBP; numerous indices and models are used in making assessments	DEP collects this data; some data is used in preparing the state's 305(b)
New Hampshire	NH DES has a program which has begun collecting aquatic biological data	developing reference conditions site by site	macro invertebrate and fish population sampling	program has been sampling sites for the last three years	standard sampling, etc.; most data represents reference conditions; DES samples a site once and moves on in building the reference baseline	data is in the process of being upgraded to a usable database
Rhode Island	RI DEM collects some biological monitoring data for use in 305(b)	small proportion of total waters; approximately 45 sites are sampled	variety of aquatic community parameters, including macro invertebrates at ome sites	several years of data exist at most sites; approximatley 5 sites have macro invertebrate data going back 10-15+ years; data used in biennial 305(b) reports	standard sampling and protocols	hard copy sampling data; indices and other metrics are not formally generated and published; data is used in preparing some water quality assessments included in the 305(b)
Vermont	VT ANR maintains an active biological monitoring program and uses this data in preparing some of the state water quality assessments	approximately 1300 miles of waterway havde been sampled; approximately 50-60 sites continue to be sampled annually	fish and macro invertebrate communities and physical habitat are assessed to develop IBI values and other indices to determine aquatic life use support	ongoing biological sampling program since 1982; data used in biennial 305(b) reporting	standard sampling and protocols, RBP	VT ANR, DEC maintains this data, some incorporated into aquatic life use support determinations in the 305(b) report

SCREENING RESULTS: Interview Results

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EPA – NEW ENGLAND

Database EPA does not maintain a database of aquatic community health data in the New England states, which might support this indicator. EPA does collect biennial state water quality assessments (305b reports), of which some determinations of include aquatic life use support determinations which have drawn on aquatic community assessment data. This data is currently limited.

[See individual state forms].

Coverage

Waters [See individual state forms].

Parameters [See individual state forms].

Temporal [See individual state forms].

Quality/ Methodology [See individual state forms].

Availability [See individual state forms].

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CONNECTICUT

Database Connecticut has utilized biological monitoring including aquatic community health in preparing a subset of use support assessments in their 305(b) reports.

Coverage

Waters Connecticut has utilized biological monitoring since 1973, and incorporated this data into its 305(b) report since 1988. Connecticut has attempted to increase the coverage of its biological monitoring efforts, but faces ongoing resource constraints. Approximately 50 fixed sites cover 34 waterbodies and are used on a rotating basis to make aquatic health assessments. These are in addition to assessments made using data from sites selected on an ad hoc basis as needed. Connecticut has assessed fewer than 300 miles of rivers and streams using biological criteria.

Parameters Waters are assessed using a version of the rapid Bioassessment Protocol. Several parameters of macro invertebrate community structure and derived indicators are uses in making assessments. Narrative biological criteria were incorporated into the state's water quality standards in 1987, and numerical criteria have been implemented since, as resources permit.

Temporal Bioassessments have been incorporated in making a small portion of the aquatic life use support assessments since 1988. Macro invertebrate data has been collected since 1973.

Quality/ Methodology Connecticut utilizes a version of EPA's RBP, and other standard sampling and assessment techniques. Assessments are primarily based on macro invertebrate community data, although limited fish population data has been collected when possible.

CT DEP regularly targets biological assessments to areas of specific need, including spills, pollution source impacts, and in evaluating the effectiveness of waste treatment installations.

Availability Asssessments are reported in the 305(b) report along with those made on non-biocriteria information. The CT DEP collects aquatic biology data on an ongoing basis.

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MAINE

Database The Maine DEP has been built a database of biological sampling data since the early 1970s. This is primarily a baseline database of benthic macro invertebrate community samples. Since 1986, the state has used biological data in making determinations of aquatic life use support in its 305(b) report.

Coverage

Waters Maine DEP has assessed approximately 300 miles of rivers and streams utilizing biocriteria/assessments, by drawing on data from 200 sites since the monitoring program began. Sampling has been conducted below all significant inland wastewater discharges. Many reference sites above pollution sources and other pristine conditions have been sampled.

Parameters In 1986, the state adopted definitions of aquatic life use for purposes of 305(b) assessment, that include narrative descriptions of characteristics which must be met, and corresponding numerical criteria. These include the support of indigenous fish populations and the maintenance of the structure and function of resident biological community. The characteristics are specific to each waterbody classification. The DEP utilizes probablistic models and serveral indices drawn from macro invertebrate data in making assessments.

Temporal Macroinvertebrate data has been collected since the early 1970s, and applied to formal aquatic health criteria for the 305(b) since 1986.

Quality/ Methodology ME DEP utilizes standard protocols, methods, and guidelines, including well-defined state standards. Statistical methods and models are used in making attainment determinations. ME has built an extensive baseline database including numerous reference conditions.

Availability ME DEP database of macro invertebrates. Data incorporated into biennial 305(b) assessments.

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MASSACHUSETTS

Database In preparing the state's 305(b) report, Massachusetts DEP draws on a variety of aquatic health monitoring data in order to assess support for aquatic life use designations.

Coverage

Waters Aquatic health sampling is conducted for a limited set of waters assessed for the state's 305(b) report. While Massachusetts has implemented a rotating basin assessment schedule, assessments continue to be targeted primarily towards problem sites. Assessments cover approximately 300 miles of rivers and streams, drawing on data from 21 sites.

Parameters Aquatic health data used in determining aquatic life use support as defined by the state, includes chemical and toxicity data, as well as some macro-invertebrate measures which are used in a combination of metrics. The degree of macro-invertebrate community impairment determines the corresponding degree of use support (i.e., not supporting, fully supporting, partially supporting).

Temporal Biennial 305(b) reporting.

Quality/ Methodology DEP has used a variety of data and seven metrics in determing aquatic health. The Department has established its own protocols and guidance, and uses the EPA Rapid Bioassessment Protocols.

Availability DEP tracks these assessments. DEP did not identify a database used to maintain this data.

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NEW HAMPSHIRE

Database New Hampshire DES has begun a program of biological water assessments. The agency is in the process of creating a database for this assessment information.

Coverage

Waters Current focus is on specific sights of interest, while trying to establish a baseline (i.e. reference conditions) for the state's waters. DES samples a sight once, the moves to another in establishing the reference conditions.

Parameters Sample for macro-invertebrate and fish populations.

Temporal Program has been in operation for approximately the last three years, mostly gathering reference condition data during this time.

Quality/ Methodology DES relies on standard protocols. Most data collected to date represents reference conditions.

Availability Bioassessment data is not yet in a useable database.

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RHODE ISLAND

Database In preparing the state's 305(b) report, Rhode Island DEM draws on a variety of aquatic health monitoring data in order to assess support for aquatic life use designations.

Coverage

Waters RI DEM collects biological data from approximately 45 sites, covering a small proportion of the states waters and those waters assessed in the 305(b).

Parameters DEM utilizes the EPA Rapid Bioassessment Protocol, sampling a variety of biological community data, including macro-invertebrates at some sites.

Temporal Biennial 305(b) reporting. Macro-invertebrates at several deep-water sites have been sampled for many years.

Quality/ Methodology DEM utilizes standard protocols in conducting bioassessments.

Availability This data is kept in hard copy. Indices (e.g., IBI) are not typically generated from this data, although such calculations are potentially feasible.

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VERMONT

Database Vermont has maintained an active and extensive biomonitoring program since 1982. Data collected is used in determining aquatic life use support for the 305(b), and in creating a state fish community index of biotic integrity (IBI), and macro-invertebrate metrics.

Coverage

Waters Approximately 50-60 sites are sampled annually. Other 350 sites have been sampled since the program began. Approximately 1300 miles of rivers and streams are characterized.

Parameters Fish and macro-invertabrate communities and physical habitat are assessed to develop IBI values, macro-invertebrate indices, and to determine aquatic life use support.

Temporal Biennial 305(b) reporting includes some assessments drawn from biological data. Biological assessment program has sampled since 1982.

Quality/ Methodology Vermont utilizes protocols modified and consistent with EPA's Rapid Bioassessment Protocol.

Availability VT ANR, DEC maintains this data.