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The American Fisheries Society (AFS) recently published *Standard Methods for Sampling North American Freshwater Fishes*. Enlisting the expertise of 284 scientists from 107 organizations throughout Canada, Mexico, and the United States, this text was developed to facilitate comparisons of fish data across regions or time. Here we describe a user-friendly web tool that automates among-sample comparisons in individual fish condition, population length-frequency distributions, and catch per unit effort (CPUE) data collected using AFS standard methods. Currently, the web tool (1) provides instantaneous summaries of almost 4,000 data sets of condition, length frequency, and CPUE of common freshwater fishes collected using standard gears in 43 states and provinces; (2) is easily appended with new standardized field data to update subsequent queries and summaries; (3) compares fish data from a particular water body with continent, ecoregion, and state data summaries; and (4) provides additional information about AFS standard fish sampling including benefits, ongoing validation studies, and opportunities to comment on specific methods. The web tool—programmed in a PHP-based Drupal framework—was supported by several AFS Sections, agencies, and universities and is freely available from the AFS website and fisheriesstandardsampling.org. With widespread use, the online tool could become an important resource for fisheries biologists.

Herramienta en línea para comparar datos de peces de agua dulce colectados mediante métodos estándar de la AFS

La sociedad Americana de Pesquerías (AFS) publicó recientemente el libro *Métodos estandarizados para el muestreo de peces dulceacuícolas de Norteamérica*. Este texto acopia la experiencia de 284 científicos pertenecientes a 107 organizaciones que van desde Canadá hasta México y los Estados Unidos de Norteamérica, y fue desarrollado para facilitar comparaciones de datos sobre peces entre regiones y épocas. Aquí se describe una herramienta amigable que funciona en línea y sirve para automatizar comparaciones entre muestras de la condición de los peces, distribuciones de frecuencia de tallas y captura por unidad de esfuerzo (CPUE) obtenidos mediante métodos estándar de la AFS. Actualmente, esta herramienta (1) proporciona instantáneamente resúmenes de casi 4,000 sets de datos de condición corporal, frecuencia de tallas y CPUE de los peces dulceacuícolas más comunes, colectados mediante artes estandarizadas en 43 estados y provincias; (2) se puede fácilmente agregar información y nuevos datos de campo estandarizados, con el fin de actualizar requisitos y sumarios; (3) compara datos sobre peces en un cuerpo de agua en particular, incluyendo resúmenes por continente, ecoregión y estado; y (4) provee información adicional sobre el muestreo estandarizado de peces de la AFS, incluyendo beneficios, estudios en curso para validación de datos y oportunidad para hacer comentarios sobre métodos particulares. Esta herramienta en la red, programada sobre la base PHP en ambiente Drupal, fue financiada por varias secciones de la AFS, agencias y universidades, y es de acceso gratuito desde el portal de la AFS y de fisheriesstandardsampling.org. De uso ampliamente difundido, esta herramienta en línea pudiera convertirse en una fuente importante de información para biólogos pesqueros.

Un outil Web simple pour comparer les données recueillies sur les poissons d'eau douce à partir des méthodes normalisées AFS

La Société américaine des pêches (AFS) a récemment publié des méthodes normalisées d'échantillonnage pour les poissons d'eau douce d'Amérique du Nord. Compilant l'expertise de 284 scientifiques de 107 organisations au Canada, au Mexique et aux États-Unis, ce texte a été élaboré pour faciliter les comparaisons de données sur les poissons dans différentes régions ou sur différentes périodes. Nous décrivons ici un outil Web convivial qui automatise les comparaisons entre échantillons selon l'état de chaque poisson, les distributions des tailles des populations, et la prise par unité d'effort recueillies à l'aide des méthodes normalisées AFS. Actuellement, l'outil Web (1) fournit des résumés instantanés de près de 4000 jeux de données relatives à l'état, à la distribution des tailles, et aux prises par unité d'effort de poissons d'eau douce communs, recueillies à l'aide d'équipements standards dans 43 États et provinces; (2) accepte facilement de nouvelles données de terrain standardisées pour mettre à jour des requêtes et des résumés ultérieurs; (3) compare les données sur les poissons d'un plan d'eau particulier avec celles résumées, d'un continent ou d'une écorégion, ainsi qu'avec les données publiques; et (4) fournit des informations supplémentaires à propos de l'échantillonnage de poissons standard d'AFS, y compris les avantages, les études de validation en cours, et la possibilité de commenter des méthodes spécifiques. L'outil Web programmé selon une architecture logicielle Drupal PHP — a été soutenu par plusieurs sections AFS, organismes et universités et est disponible gratuitement depuis le site AFS et sur fisheriesstandardsampling.org. Gageons que son utilisation répandue pourra en faire un outil de référence pour les biologistes de la pêche.

Standardized tests to measure basic parameters such as cholesterol, body temperature, heart rate, and blood pressure have been used successfully to diagnose human health problems for decades. In a similar way, standardized measurements can be used by fisheries scientists to diagnose the status of selected fish stocks. With the recent publication of the American Fisheries Society's (AFS) *Standard Methods for Sampling North American Freshwater Fishes* (Bonar et al. 2009), fisheries professionals now have access to a powerful tool for comparing basic fisheries parameters across large regions.

Standardized fish sampling entails the use of the same gear types fished in the same manner in different waterbodies or in the same waterbody over time. The standard sampling methods presented in Bonar et al. (2009; henceforth referred to as *Standard Methods*) and outlined in Table 1 are a consensus set developed by the AFS Fisheries Management Section in collaboration with 10 other sponsors and developed by 284 biologists from 107 state, federal, and local agencies; universities; and nongovernmental organizations who served as authors, reviewers, sponsors, or data providers. These methods were developed for use in five major types of waterbodies (small standing waters, large standing waters, wadeable streams, rivers, and two-story systems) containing either warmwater (e.g., sunfish, temperate bass, herring, catfish, pike) or coldwater fish species (e.g., trout, salmon, burbot).

Standard sampling confers important benefits (Bonar and Hubert 2002). Standardization of methods reduces the variability and measurement uncertainty that are introduced

Table 1. Recommended standard sampling gear type by water body type and fish species type (W = warmwater, C = coldwater). Reproduced from *Standard Methods* (Bonar et al. 2009) with permission.

		Electrofishing			Nets						Other		
Species	**Water body**	**Boat/ raft**	**Back- pack**	**Tow barge**	**Gill**	**Fyke/ trap**	**Trammel**	**Seine**	**Trawl**	**Hoop**	**Snorkeling**	**Acous- tics**	**Redd counts**
W	Small standing waters	X			X	X		X					
W	Large standing waters	X			X	X							
W	Wadable streams		X	X				X					
W	Rivers	X					X	X	X	X			
C	Small standing waters				X								
C	Large standing waters				X				X			X	
C	Wadable streams		X								X		X
C	Rivers	X			X			X			X		
Two-story	Standing waters	X			X	X			X			X	

by differing gear types with unknown biases. Because fewer gear types are used under standardization, gear types and procedures can be "ground-truthed" under a much wider array of environmental conditions. Using well-accepted standard methods lends additional data credibility and user confidence to a study. Standardization allows easier data comparisons and communication, a benefit that is becoming increasingly important as large-scale perturbations such as climate change push fisheries professionals to compare data among multiple states, countries, and continents.

The ability to perform rapid comparisons with a centralized database of samples (i.e., a baseline) could be a particularly powerful outcome of coordinated standard sampling programs. Consider the speed with which your physician can rank any of your vital measurements against a national percentile. Similar analytical capability could be of great value to fisheries managers who seek to diagnose problems in the health of a fish stock or recommend corrective action. For example, a manager may want to know whether the abundance, condition, or growth of a particular fish stock or population is above, below, or equivalent to a regional or national average.

Currently, opportunities to perform such data comparisons are limited. Printed summaries of fish data, including information on mean fish growth, condition, and other factors, have provided comparison data (e.g., Carlander 1969, 1977, 1997; Brouder et al. 2009). Printed summaries, although useful, can be difficult to compare quickly and cannot be updated easily. Computerized data compilations have also been developed. Pioneering efforts include the Illinois Fisheries Analysis System (Bayley and Austen 1989), the Multistate Aquatic Resources Information System (Beard et al. 1998), and Iowa's Department of Natural Resources (DNR) Water Web (Iowa DNR 2012), which allow data comparisons across large geographic areas. However, these systems include data collected by a variety of methods, many of which may not be directly comparable to the AFS standard methods, and they lack a repository of comments to assist future *Standard Methods* editors and authors improving data usage and analysis.

To facilitate direct comparison of fish samples that were collected following the *Standard Methods* guidelines and to inform fisheries scientists about the benefits of standardization and the AFS process, the AFS Fisheries Management Section, in collaboration with the U.S. Geological Survey, National Park Service, U.S. Forest Service, University of Arizona, and University of Guadalajara (Mexico), and others created a web-based tool accessible at fisheriesstandardsampling.org. This web tool is already populated with a large database of standardized freshwater fish samples and can be easily appended with new data. It can also be used to summarize and compare some of the measures most commonly used by freshwater fisheries biologists such as catch per unit effort (CPUE), length frequency distribution, and individual fish condition. Furthermore, it contains a variety of other information about AFS standard methods, such as benefits, validation, and opportunities to comment.

Here we describe this web tool, how it complements *Standard Methods*, and key features available to users with a click of a button. We describe the process by which the web tool compares data on simple fish community parameters and how it can serve as a repository for comments to be used to fine-tune standard methods of the future. Further, we describe future capabilities planned for the web tool and ways that it could be potentially linked with other data repositories.

WEB TOOL DESIGN

The web tool was developed through collaboration with web designers, database specialists, fisheries biologists, and information technologists from the University of Arizona and AFS. It was built with the Drupal framework and PHP scripting language using MySQL as a relational database management system. To maximize its accessibility and longevity, we built fisheriesstandardsampling.org with the following seven primary objectives:

1. *Simplicity.* The web tool is designed to be as simple and user-friendly as possible, moving from data selection and analysis to a clear, standardized report of results as quickly as possible. Most busy fisheries professionals wish to concentrate on diagnosing problems in fish populations and applying management solutions rather than learning yet one more computer program. We therefore chose to exclude

many features that would have expanded the web tools capabilities but required a steeper learning curve.

2. *Standardized.* The web tool will only integrate fisheries data that were collected using AFS standard methods. Users wishing to upload new samples must first certify that their data were collected in accordance with *Standard Methods*.
3. *Useful.* The web tool can compare sample data from an individual water body to continental, regional, and/or state-level averages and percentiles of three of the most commonly cited fisheries biology metrics: CPUE, length frequency, and condition. Growth is planned for entry into future editions, pending additional funding.
4. *Expandable.* The web tool can continually grow through crowd-sourced contributions. The initial data that was input to the tool includes the standard samples described in Brouder et al. (2009). But new data, entered by users, can be incorporated once automated quality control checks have been satisfied.
5. *Compatible.* The web tool is designed to connect to other databases containing AFS standard data, extending the use of existing databases.
6. *Adaptable.* The web tool will allow users to provide comments on improvements that can or should be made to *Standard Methods*. These comments could be provided to future authors and editors of updated versions.
7. *Informative.* The web tool will explain the value of standard methods and discuss research on validation/calibration research for methods. Ground-truthing standard techniques is a powerful means to describe how statistics generated from standard sampling techniques compare to actual fish population parameters; that is, obtaining "the true picture" (sensu Kubečka et al. 2009). This part of the web tool would provide information on equations that were used to intercalibrate *Standard Methods* with other techniques (e.g., Ryswyk 2013; Smith 2015; S. Sandstrom and coworkers, Ontario Ministry of Natural Resources, unpublished data) and ground-truth sample data supplied by *Standard Methods* to describe actual population parameters (e.g., Price and Peterson 2010).

To populate the initial database, we requested standard data from fisheries organizations throughout North America. This request produced data from 4,092 fish surveys distributed throughout 43 states and Canadian provinces. Descriptions of sampling methods required at the time of submission were examined for compatibility with *Standard Methods,* and then a subset was selected for inclusion in the initial database. As of November 2014, data in the web tool consisted of almost 800,000 individual records from over 3,600 sampling events (Table 2). Fifteen common North American fish species were represented in the initial database: Largemouth Bass *Micropterus salmoides*, Smallmouth Bass *M. dolomieu*, Bluegill *Lepomis macrochirus*, White Crappie *Pomoxis annularis*, Black Crappie *P. nigromaculatus*, Channel Catfish *Ictalurus punctatus*, Striped Bass *Morone saxatilis*, Yellow Bass *M. mississippiensis*, Northern Pike *Esox lu*cius, Walleye *Sander vitreus*, Yellow Perch *Perca flavescens*, Brown Trout *Salmo trutta*, Rainbow Trout *Oncorhynchus mykiss*, Brook Trout *Salvelinus fontinalis*, and Cutthroat Trout *O. clarkii*.

The web tool was designed to accept data for other species and additional data for those species already in the database. We anticipate that the number of species available for comparison and the amount of data for calculating robust summaries will grow as the tool receives increased use. An important and mandatory stipulation for using the system is that new uploaded data will be included in relevant summary calculations (e.g., state, regional, and range-wide summaries). These regional summaries are calculated in an anonymous manner and do not disclose the specifics of any individual samples. For any number of reasons (e.g., revealing the locations of protected species or prepublication data embargoes), users may wish to contribute to a synthetic knowledge base without sharing their specific data, and the web tool will accommodate this. However, the web tool will also accommodate users who wish to make data from their specific survey available to others. Data from specific surveys, such as has appeared in Carlander (1969, 1977, 1997) and other sources, were necessary for the development of many important tools in fisheries management (e.g., relative weight indices).

Because ease and rapidity of use was a fundamental objective for web tool design, we made a concentrated effort to design simple, effective graphical user interfaces. We maximized use of drop-down menus and simple text input boxes for obtaining basic information about the sampling event. A Google Maps interface was incorporated into the web tool to allow users to locate and select the sampled water body and, once selected, to automatically load data describing its location such as coordinates, state, country, level-one ecoregion (CEC 1997), and eight-digit hydrologic unit code.

Survey data upload procedures were also designed to be as simple as possible. We built the web tool to accept data from comma separated value (CSV) text files, which can be easily generated from commonly used spreadsheet programs, such

Table 2. Comparison data available in the AFS *Standard Methods* web tool as of November 2014. Data include the lengths and weights of individual fish (records) and length frequency and catch per unit effort results from individual sampling events conducted throughout North America. Users can upload new data to increase the robustness of comparisons.

Common name	Scientific name	Number of records	Number of sampling events
Black Crappie	*Pomoxis nigromacu-latus*	38,770	235
Bluegill	*Lepomis macrochirus*	44,900	317
Brook Trout	*Salvelinus fontinalis*	37,175	314
Brown Trout	*Salmo trutta*	60,516	216
Channel Catfish	*Ictalurus punctatus*	449	55
Cutthroat Trout	*Oncorhynchus clarkii*	4,953	41
Largemouth Bass	*Micropterus salmoides*	145,633	898
Northern Pike	*Esox lucius*	54,023	125
Rainbow Trout	*Oncorhynchus mykiss*	1,283	74
Smallmouth Bass	*Micropterus dolomieu*	66,471	329
Striped Bass	*Morone saxatilis*	8,505	24
Walleye	*Sander vitreus*	117,743	319
White Crappie	*Pomoxis annularis*	38,535	168
Yellow Bass	*Morone mississippiensis*	708	15
Yellow Perch	*Perca flavescens*	164,943	335
Others		11,064	149
Total		795,671	3,614

as Microsoft Excel. Data required to describe a sampling event are minimal: individual fish number; species identification, length, and weight; sampling transect or net number; and amount of effort. To avoid confusion among organizations using different fish species codes or common names, full scientific names corresponding with those recognized in AFS *Names of Fishes* (Page et al. 2013) must be entered into the data file (note that the "Fish Name Spellchecker" download, available at fisheries.org/fishnames, can greatly facilitate manual entry of scientific names). Length and weight values accepted by the web tool are those most commonly used by North American fisheries scientists: maximum total length of individual fish in millimeters and weight of individual fish in grams. Units of effort for gear types are those reported in *Standard Methods*—net nights for net sets, seconds recorded on the control unit's timer for electrofishing, fish per haul for stream seines, etc.

Currently, the web tool automates comparisons of mean CPUE of greater than or equal to stock length fish (e.g., Gablehouse 1984) and relative weight and length frequency by proportional size distribution (PSD) length groups (Gablehouse 1984; Guy et al. 2007). Because most current fishery indices were not developed to include age-0 fish and the extreme variability in their abundance can mask trends in age-1 fish and larger CPUE, they are not currently included in the web tool. However, means to analyze data for smaller fish may be included in the future depending on need. Growth has not been incorporated into the web tool yet, pending funding. However, plans are to incorporate comparisons of back-calculated length at age.

Following development, we presented the web tool to database managers, biologists, and information technology specialists at AFS meetings in 2012 and 2013 for initial demonstration, further comments, and fine-tuning. Most of their comments and suggestions were incorporated into the program. In addition, we consulted with Google programming engineers from their Mountain View, California, headquarters to further fine-tune the program.

HOW TO USE THE WEB TOOL

The development effort provided a web tool that allows rapid data upload, analysis, and printout in a simple series of steps (Figure 1). To upload new data to the web tool, users must first establish an account. Registered users are then presented with a "Submit Sampling Event Data" form, beginning with a notification box confirming that the new data were collected in accordance with *Standard Methods* (Figure 1, see red box at top). Information provided in a sidebar shows how data should be formatted

Figure 1. Data entry page from fisheriesstandardsampling.org.

to enter into the model (Figure 2). The user is also directed to check a box if they agree to share data from their specific survey with others.

Next, the user is directed to select, using drop-down style menus, the type of water body surveyed and the standard gear used to collect fish (Figure 1). These both correspond to water bodies and gear types described in *Standard Methods*. The water body name is entered, and its location in the Google map insert is found and selected. As described previously, geographic data (location, state/province, country, ecoregion, eight-digit hydrologic unit code, and latitude/longitude fields) are automatically populated into the web tool when the water body is selected on the map; however, manual entry of this data is possible as well (Figure 1).

Once the location, date, and other sampling details have been specified, the formatted CSV file of standard fish survey data is selected and uploaded (Figure 2). The user is then requested to input the date of the survey and provide details on any deviations from AFS standard sampling methods so inclusion of the data into the summaries can be further evaluated.

To run the comparisons, the user selects the "save" button. If fish species are included in their survey that are not currently in the database, or if errors are found, the user is informed of the discrepancies. The user is then prompted to correct the data or "ignore species discrepancies" in a check box and is directed to select the save button when a decision is made. If species discrepancies are ignored, the species appearing in the specific sample, but not in the database, are excluded from further comparison. However, the new species will be added to baseline summaries for future comparisons.

When the sampling event has been saved successfully, the user is provided with a summary of the information; this quality assurance/quality control step allows the user to correct, if needed, any data entry errors prior to viewing comparison calculations. Once the user is satisfied, summaries of statistics for the individual species of interest can be selected. When a species is checked, the user can select the type of spatial comparison desired (i.e., North American, ecoregion, or state) from a drop-down menu. When this selection is made, a map is generated showing the locations of all baseline survey samples (Figure 3).

Three plots are then provided. A plot is generated comparing CPUE from the new sample with baseline 25th, 50th, and 75th percentiles (i.e., quartiles) for the selected spatial scale of comparison (Figure 3). A second plot is provided comparing length-frequency data for the new sample, subdivided by PSD groups, to summarized data of the region selected. Finally, a third plot is generated, showing how relative weights of fish from the new sample, again subdivided by PSD size group, compare to the baseline quartiles of the region selected (Figure 3). Underneath or next to each plot, sample sizes used to develop each baseline summary are shown. A clickable "Download Chart Data" is shown next to each plot that will take the user to the spreadsheet of the raw baseline data, allowing further development, customization, and querying of the baseline information, if the provided plots do not meet the user's needs.

An example of how the web tool can be used for diagnosis and management is provided in Figure 3 for an Arizona pond ("small standing water"). A standardized spring electrofishing survey of Largemouth Bass within the pond was performed, and the CPUE of stock size Largemouth Bass was quite low compared to other small ponds in North America. A close examination of the length-frequency data shows that a high proportion of fish in the larger "Q-P" length range were present in the catch when compared to the continental baseline data, suggesting recruitment to stock size may be limiting in this pond. Low relative weights of fish in the sample compared to continental baseline data indicate that these fish were feeding poorly. Similarly, Bluegill had low CPUE and relative weight indicating poor feeding (data not shown). Fisheries biologists

	A	B	C	D	E	F	G
1	Transect#	Fish Number	Species	length	weight	effort	
2	1	1	Lepomis macrochirus	83		589	
3	1	2	Lepomis macrochirus	88		589	
4	1	3	Lepomis macrochirus	88		589	
5	1	4	Lepomis macrochirus	93		589	
6	1	5	Lepomis macrochirus	94		589	
7	1	6	Lepomis macrochirus	96		589	
8	1	7	Lepomis macrochirus	88	10	589	
9	1	8	Lepomis macrochirus	92	15	589	
10	1	9	Lepomis macrochirus	94	15	589	
11	1	10	Lepomis macrochirus	96	20	589	
12	1	11	Lepomis macrochirus	104	25	589	
13	1	12	Micropterus salmoides	285	265	589	
14	1	13	Micropterus salmoides	371	620	589	
15	1	14	Micropterus salmoides	245	165	589	
16	1	15	Micropterus salmoides	357	550	589	
17	1	16	Micropterus salmoides	280	255	589	
18	1	17	Micropterus salmoides	408	850	589	
19	1	18	Micropterus salmoides	342	485	589	
20	2	19	Lepomis macrochirus	108	25	602	
21	2	20	Lepomis macrochirus	109	25	602	
22	2	21	Lepomis macrochirus	104	25	602	
23	2	22	Lepomis macrochirus	105	20	602	
24	2	23	Lepomis macrochirus	110	25	602	

Figure 2. Example of a CSV file for an electrofishing survey created with Microsoft Excel showing the data format required for upload to the AFS *Standard Methods* web tool. Transect # is the number of an electrofishing transect in which each individual fish was captured. Fish number is a sequential number given to each fish captured in a given sampling event, with total length in millimeters and weight in grams. Effort is expressed in "seconds of sampling" as described in *Standard Methods*. For other survey types, Transect # and Effort correspond to units described in *Standard Methods*.

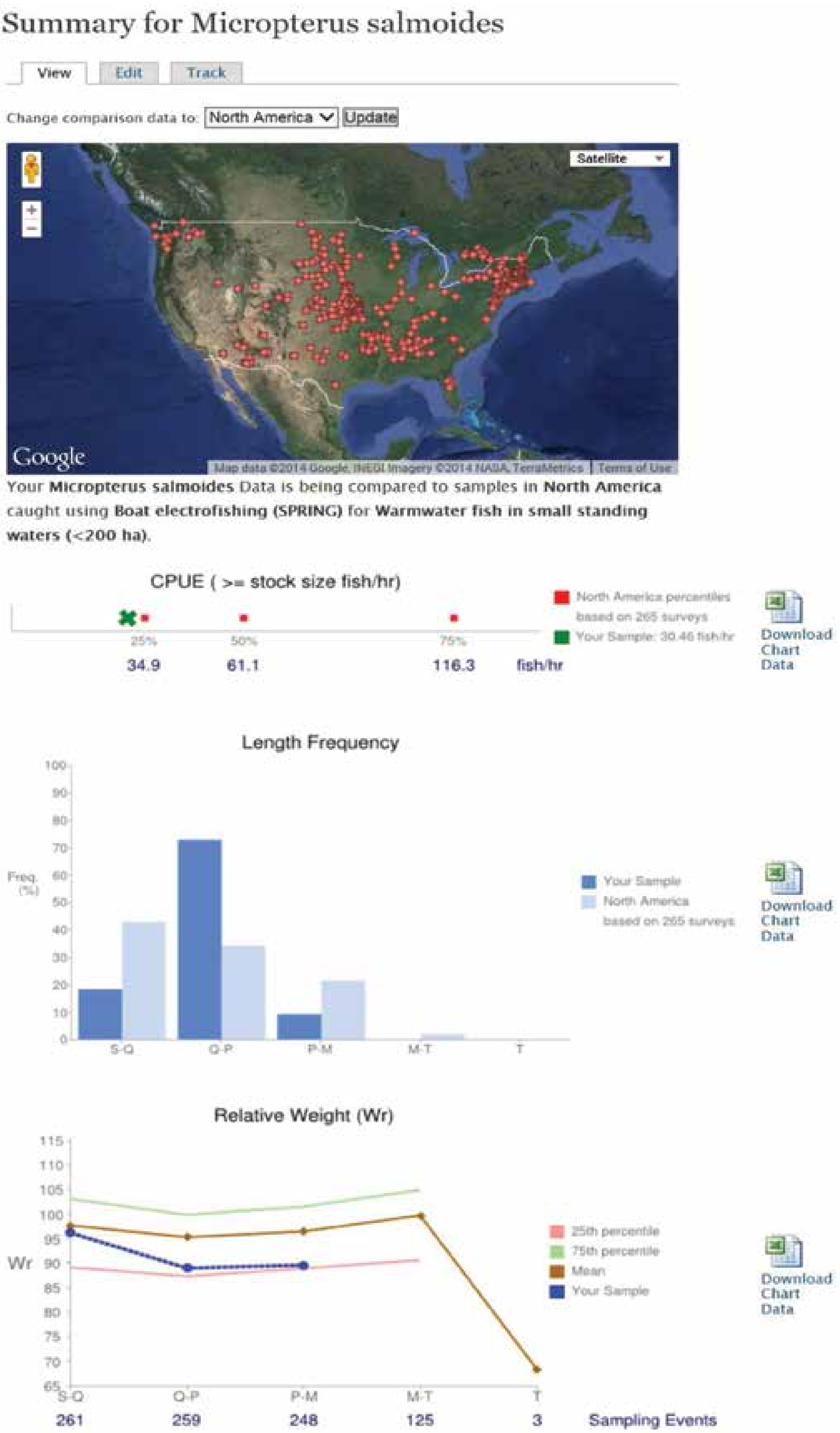

Figure 3. AFS *Standard Methods* Web tool results showing comparisons of CPUE, length-frequency distribution, and relative weights (individual condition) of Largemouth Bass in an Arizona pond relative to continental averages and percentiles. Details of the sampling method used in the comparisons are shown under the map at top. “S-Q,” “Q-P,” “P-M,” “M-T,” and “T” represent incremental stock-quality, quality-preferred, preferred-memorable, memorable-trophy, and greater than trophy length fish, respectively (see Gablehouse 1984).

considered this information in light of prior knowledge that the surveyed pond was previously overstocked with Grass Carp *Ctenopharyngodon idella* in an effort to remove aquatic macrophytes. All vegetative cover in the pond was removed by the Grass Carp, after which water turbidity sharply increased, likely due to Grass Carp foraging in the sediment. Taken together, this information suggested to fisheries biologists that removal of some of the Grass Carp to increase vegetative cover for small fishes, thus enhancing juvenile recruitment, and to reduce abiotic turbidity, thereby increasing foraging success (i.e., relative weights), would likely benefit the pond's Largemouth Bass population. This was the recommendation given to the landowner.

ADDITIONAL CONSIDERATIONS

In its current form, the web tool is a flexible and potentially powerful device for compiling and analyzing standardized fisheries data. However, users should be cognizant of several nuances when using the web tool. First, the compiled baseline summaries may overrepresent specific regions of the nation, whereas data in other areas may be sparse. For example, much Largemouth Bass electrofishing survey data exist from Midwestern and Southeastern waters, and North American summaries will necessarily reflect this nonuniform distribution. This situation can be partially addressed by using regional and state-level comparisons; however, North American summaries for various species will probably be more representative of some regions than others. Currently, users can study the maps provided of the sampling locations to judge the degree or relative importance of spatial clustering relative to their management goals.

Second, the standardized sample database that is currently included with the web tool is extensive for some of the more common species in the United States and Canada, such as Largemouth Bass and Bluegill (Table 2). However, many other species have not yet been added to the web tool or are represented in the database with small sample sizes that will constrain the robustness of the automated comparisons. Clearly, the web tool will become more powerful as it receives greater use and more species and standardized samples are added. Similarly, expanding and/or adding standard methods in systems not yet covered in *Standard Methods* (i.e., sampling desert springs) will increase the utility of the web tool (Mercado-Silva and Bonar 2013). But for now, users are cautioned that the web tool will not yet satisfy some management needs.

Third, the web tool cannot automatically determine whether sampling methods that deviate in some way from *Standard Methods* are "too different" to be valid for use in web tool comparisons. Obviously, we hope and recommend that contributors will adhere exactly to procedures in *Standard Methods*. However, we also acknowledge that rigid adherence will not be feasible in all cases, and we do not believe that it is prudent to categorically exclude samples that deviate in any way from *Standard Methods*. Currently, notes detailing the degree sampling varied from *Standard Methods* are requested as part of data entry. The webmaster and associated fisheries biologists then consult these notes before the data are added to the baseline summaries. Further guidance to users describing how to evaluate data comparison when actual and recommended survey methods differ slightly will be included in upcoming versions.

In summary, the AFS *Standard Methods* web tool provides a convenient and rapid utility for conducting basic assessments of freshwater fish populations and diagnosing problems therein. It is a good example of a collaborative service that AFS can provide to the broader fisheries profession and to educational partners, as the web tool resources can easily be incorporated in class lesson plans. Furthermore, it will continually improve as the user community grows. We strongly emphasize that suggestions for improving the web tool are welcomed and encouraged.

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