

21st Century Shellfish Sanitation: Electronic Mapping & Field Data Collection Initiatives

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NESSA

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www.maine.gov/dmr

Technological Updates

- ▶ Paperless
 - Shoreline Survey
 - Aquaculture Inspections
 - Field Collection
 - Water Quality
 - Phytoplankton
 - Biotoxin
- ▶ Interactive Online Map
- ▶ Online Data Portal



Shoreline Survey (SLS)

Purpose: Identify actual and potential pollution sources in growing area

Method: Door to door survey of coastal (<500 ft from shore) properties

- ▶ Trained DMR staff examine onsite wastewater treatment systems for malfunctions
- ▶ Inspect property and observe/document all actual or potential sources of pollution
 - GPS location, pollution source codes, written description



Goal: Obtain a count of pollution sources in the growing area

Problem 1: Field work is inherently time and manpower intensive

DMR must survey all shoreline adjacent to harvestable shellfish waters at least every 12 years

- ▶ ~3000 mi (including islands) of shoreline requiring survey
 - Shoreline divided into ~2.5 mile segments (GASSID)
 - 2–6 GASSIDs completed per day
 - ~120 GASSIDs visited per year
 - ~60 crew-days per year (in teams of two)

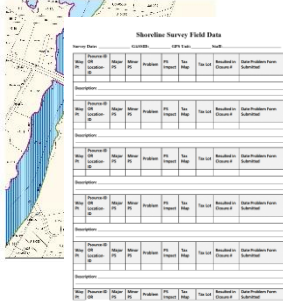
Problem 2: Entire SLS workflow requires excessive time and resources

- ▶ Prep: Paper tax maps, GIS maps, field sheets, problem forms **The dreaded shoreline survey binder**
- ▶ Post: Manual data entry
 - 30–45 min/crew–day * 60 crew–days = 30–45 extra hours/season



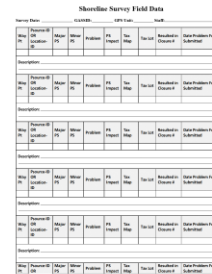
Old SLS workflow

Upper New Meadows River, East Shore



A detailed map of the Upper New Meadows River, East Shore, showing a winding river and surrounding land. Below the map is a 'Shoreline Survey Field Data' form with multiple sections for recording survey data, including station numbers, coordinates, and descriptions.

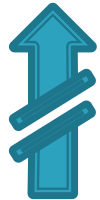
Create **HUNDREDS** of pages of maps, data sheets, & prior waypoint descriptions before each field season



A detailed map of the Upper New Meadows River, East Shore, showing a winding river and surrounding land. Below the map is a 'Shoreline Survey Field Data' form with multiple sections for recording survey data, including station numbers, coordinates, and descriptions.



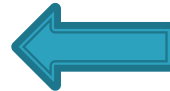
Record field data on paper data sheets, take location using handheld GPS



START OVER



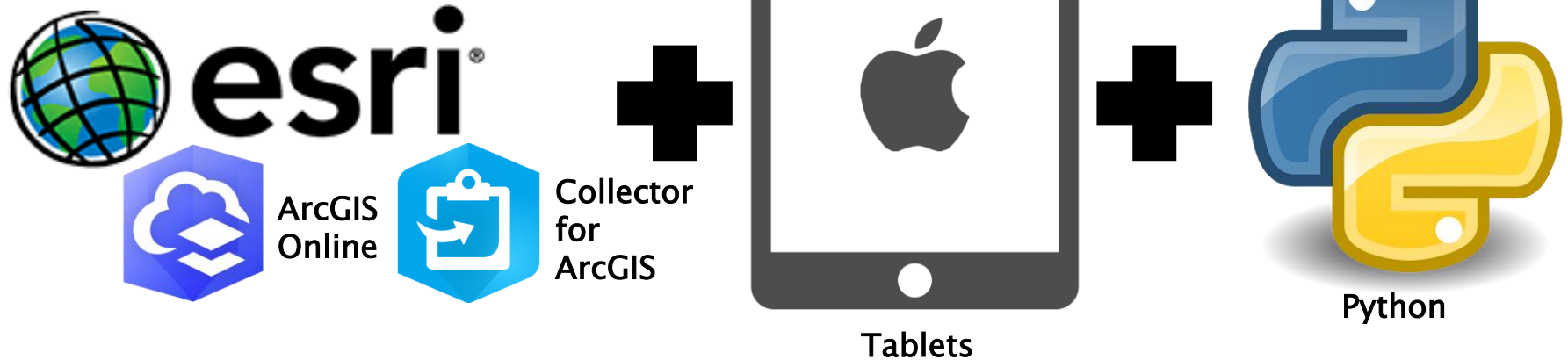
Manually update Shoreline survey GIS layers



Enter data manually in MARVIN (30–45 min per day)

Solution: Reduce time/paper with electronic data collection and automated data entry

Key Components:



New SLS Workflow:



- Cloud storage



Field data recorded in Collector on iPad, synced to SLS Map Service

- Tax maps
- Shoreline survey data
- Known pollution sources
- Auto progress recording
- Classifications
- Standardized data collection

Updated MXD of SLS Map Service



SLS Map Service published to ArcGIS Online w/ most up to date data from Collector & MARVIN



File GDB downloaded of all SLS data

- Instant data transfer from tablet to database

GIS layers stored in File GDB



Python Script queries all data, builds GIS layers



Python Script fills in spatial attributes and copies data to MS Access database



New data inspected, QC'd, & uploaded from MS Access to MARVIN, Location IDs assigned

- No transcription errors to QC

Aquaculture Inspections

- ▶ Viewable map
 - Off-line download
 - Clickable lease points
 - Lease details
 - Lease history
- ▶ Standardized data entry




Field Collection (Piloting)

- ▶ Water Quality
- ▶ Biotoxin
- ▶ Phytoplankton



Bluetooth, Wi-Fi, Cellular, 45% 2:36 PM

iForm

 **FORM**
BUILDER
Mobility | Flexibility | Reliability

Laboratory

Password

mainedmr.iformbuilder.com

Sign In

[Forgot User Name or Password?](#)

Field Collection (Piloting)

- ▶ Station location QC
 - Set distance to station IDs
- ▶ Date/time stamping
- ▶ Automatic lat/lon metadata
- ▶ Warnings for incomplete data entries
- ▶ No manual data entry
 - No transcription errors/QC
- ▶ Lab bench sheet on iForm



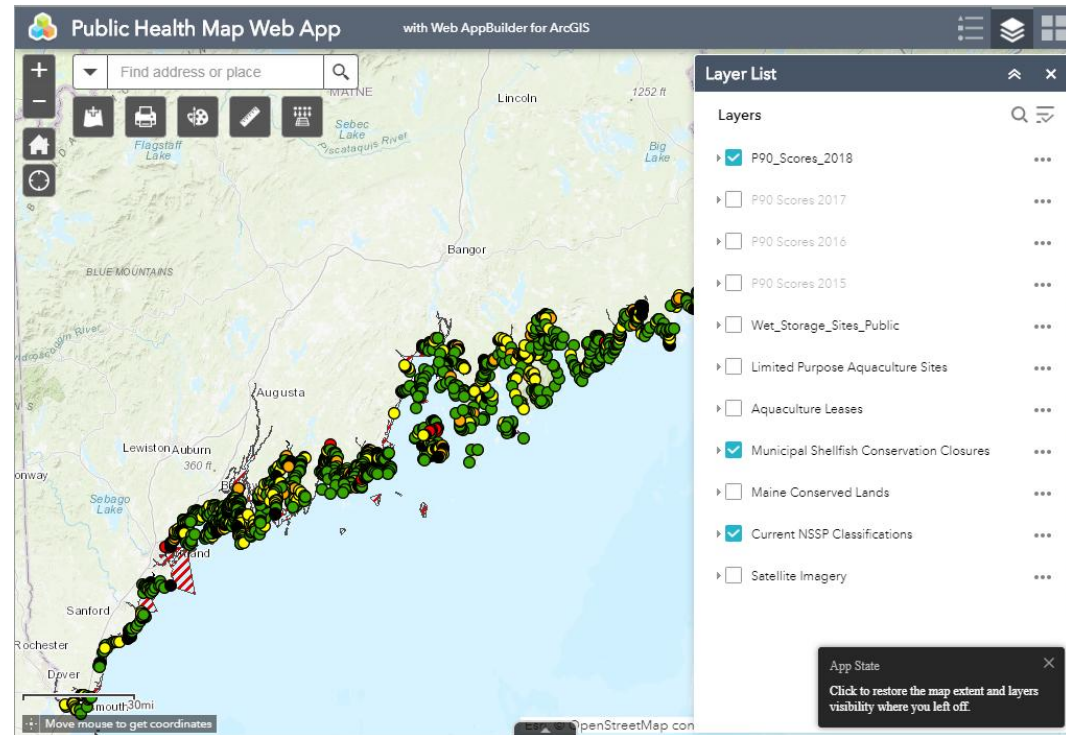
Field Collection (Piloting)

- ▶ Requires iForm license
- ▶ Paper doesn't require charging
- ▶ Purchasing tablets/smart phones
- ▶ Protective cases
- ▶ Lab may need to use iForms

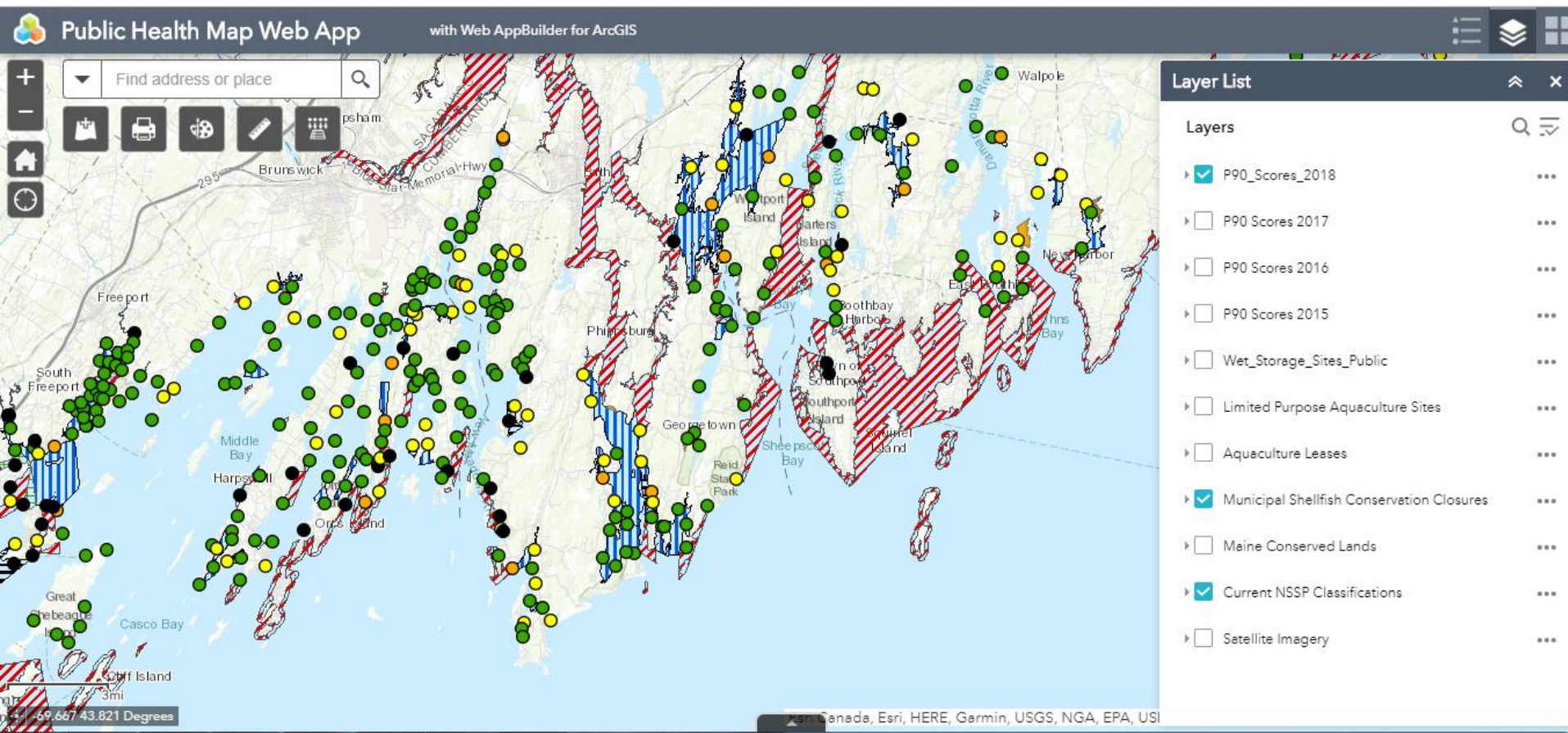


Additional Benefits of ArcGIS Online

- ▶ ESRI ArcGIS Online subscription
- ▶ Easy to edit (~current within 24hrs)
- ▶ Publicly viewable
- ▶ Higher detail than legal notice maps



Online Interactive Map



Item Views this Period

6,724

Avg Item Views Per Day

18.42

Usage Time Series

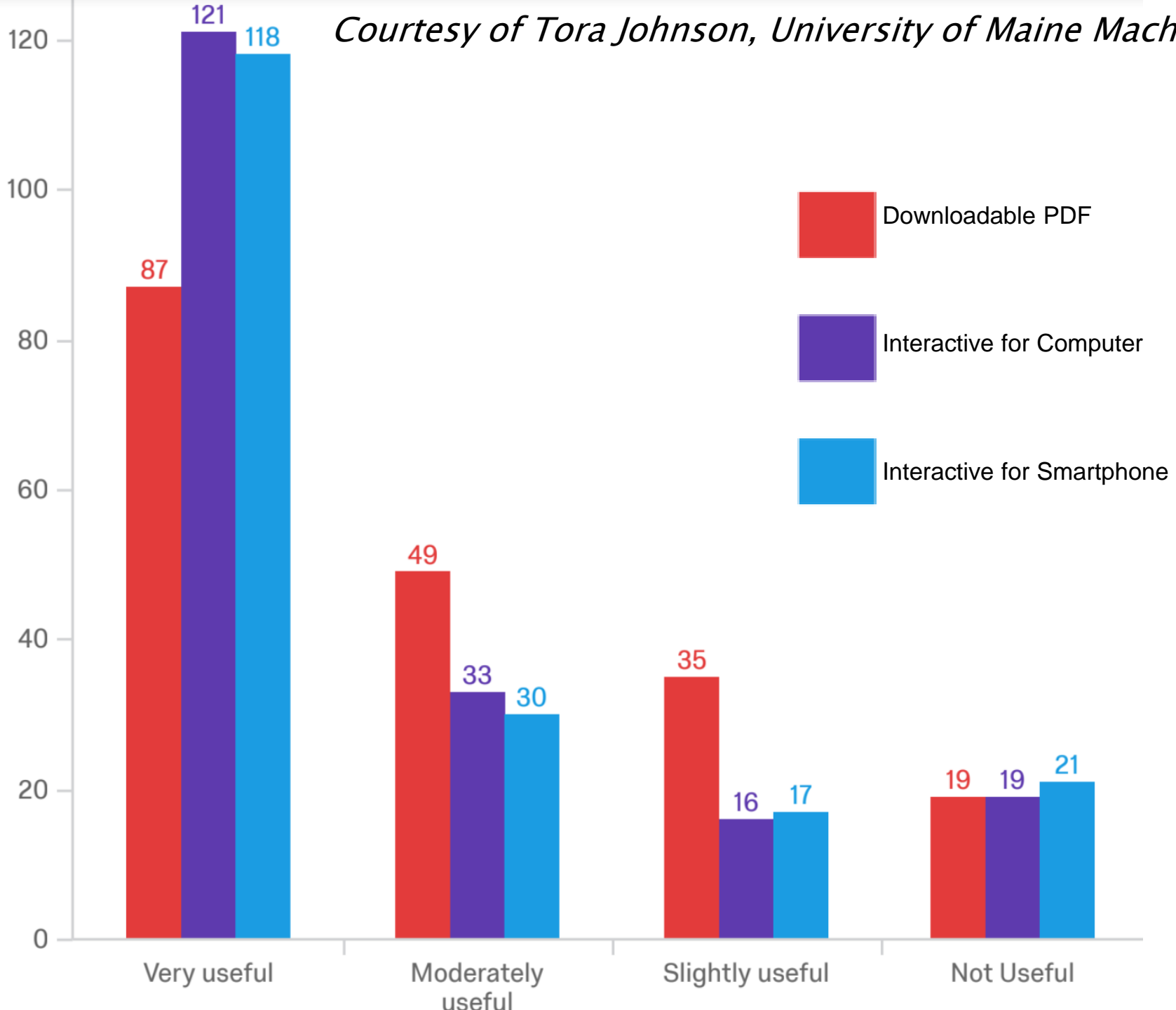


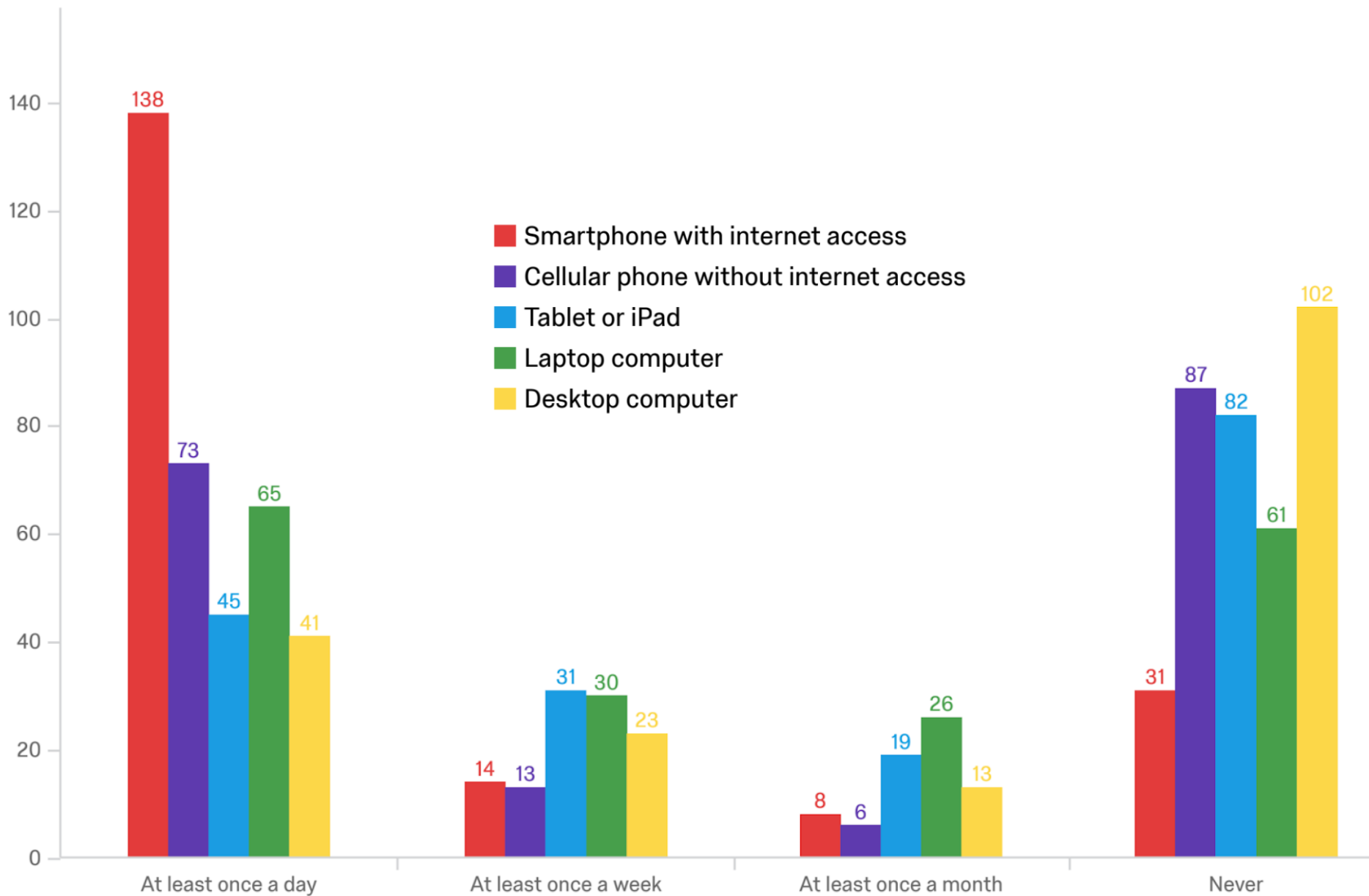
**[T]o determine where it is safe and legal to harvest shellfish, I use ____
 EVERY TIME/ MOST TIMES**

	Pro harvester	Pro farmer	Rec/ subsist harvester	Local shellfish comm member
Total Respondents	158	36	21	35
Hotline	63%	53%	48%	69%
Maps accompanying descriptions	57%	80%	59%	65%
Fellow harvesters	45%	7%	52%	34%
Email notices from DMR	37%	86%	57%	54%
Text descriptions	31%	50%	24%	33%
Other, please specify	20%	17%	17%	33%
Local shellfish comm member	16%	4%	17%	22%
DMR staff	14%	16%	24%	24%

Courtesy of Tora Johnson, University of Maine Machias

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Open Data Portal

The screenshot shows a web browser displaying the 'Maine Department of Marine Resources Open Data' portal. The URL in the address bar is <https://dmr-maine.opendata.arcgis.com/datasets/mainedmr-public-health-current-nssp-classifications?geometry=-75.94%2C43.359%2C-57.417%2C46.091>. The page features a map of Maine and surrounding areas, including the Bay of Fundy and the Atlantic Ocean. The map is titled 'MaineDMR Public Health Current NSSP Classifications'. Below the map, there is a section with a note: 'NOTE: This is a dynamic dataset. Closures can change at anytime. This map data is not to be used for legal determination of open/closed status. For current shellfish closures, consult <http://www.maine.gov/dmr/shellfish-sanitation-management/closures/index.html>. The DMR Shellfish Growing Area Classification Program classifies shellfish areas based on the results of a shoreline survey and fecal coliform testing. During a shoreline survey, DMR staff look for the presence of pollution sources. Once the information is compiled, each growing is classified as either Approved, Conditionally Approved, Restricted, Conditionally Restricted or Prohibited using standards set by the National Shellfish Sanitation Program (NSSP), a federal/state cooperative program that sets the requirements for all states involved in interstate shellfish harvest and sale. For more information about the classification of shellfish flats, visit http://www.maine.gov/dmr/rm/public_health/howclassified.htm. This dataset contains the classification for all growing areas within the state of Maine. The boundary lines for each polygon are directly described in the pollution area notices, which can be viewed at <http://www.maine.gov/dmr/shellfish-sanitation-management/closures/pollution.html>. Data projection is NAD 1983 UTM Zone 19N.' To the right of the note, there are buttons for 'Favorite', 'Download', and 'APIs'. Below these buttons, there is a dropdown menu for 'Full Dataset' with options for 'Spreadsheet', 'KML', and 'Shapefile'. There is also a 'Filtered Dataset' section with similar options. At the bottom of the page, there is a URL: https://opendata.arcgis.com/datasets/488de5c675924f16b6d480ccf77cd8dc_0.kml.

Maine Department of Marine Resources Open Data

Overview Data API Explorer

CHS, Esri, GEBCO, DeLorme, NaturalVue | CHS, Esri, GEBCO, IHO-IOC, GEBCO, DeLorme, NGS | MEDMR

MaineDMR Public Health Current NSSP Classifications

Custom License 2/14/2019 Spatial Dataset 506 Rows

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Favorite Download APIs

About

MaineDMR (Op
Shared By:
William.DeVoe
Data Source: gi

View Metadata
Create Webma
Create a Story

Full Dataset

Spreadsheet
KML
Shapefile

Filtered Dataset

Spreadsheet
KML
Shapefile

https://opendata.arcgis.com/datasets/488de5c675924f16b6d480ccf77cd8dc_0.kml

ArcGIS Online also allows hosting of downloadable data through DMR Open Data website

Next Steps

- ▶ Reorganize DMR website to emphasize web map
- ▶ Integrate tabulated station data (map/open data sites)
- ▶ Incorporate all closures
 - WQ classifications ✓
 - Municipal conservation ✓
 - Biotoxin
 - Conditional area
 - “Flood”
- ▶ Phone Application



Questions?

