Final programmatic report prepared for
NOAA Coral Reef Conservation Program

Submitted by Ecotrust September 26, 2014

Project title: *Digital Deck U.S. Virgin Islands: Pilot Electronic Trip Ticket System to Enhance Commercial Fisher Catch Reporting in Support of Caribbean Reef Fishery Management*

Award Number: NA13NOS4820016

Grant period: July 1, 2013 – June 30, 2014

Reporting Period: July 1, 2013 – June 30, 2014 *(Final report on full project period)*

Principal Investigator: Jennifer Bloeser

Executive Summary

Ecotrust received a one-year grant of $75,810 through NOAA's Coral Reef Conservation Program for a project through our Marine Consulting Initiative to **develop, deploy, and field-test an integrated technical design solution for trip ticket forms**. In the fall of 2013, Ecotrust's Marine Consulting Initiative was launched as a separate but wholly-owned subsidiary entity, Point 97, driven by the same mission: to deliver technology solutions and engagement strategies for coastal and marine planning that better connect people with place, bridge differing perspectives, and implement management decisions in an inclusive and transparent way. Point 97 works towards this mission in regions around the world through consulting, contracted services, and high-tech product development. All existing grant-funded projects will be accomplished as planned, and Point 97 will continue to partner with Ecotrust and other collaborators in future grant-funded work.

With the support of this one-year NOAA CRCP award, the project team accomplished a needs assessment for an electronic catch reporting system in the Caribbean, designed the initial product, implemented three major updates to the product, and received feedback from partners to consider through the stages of development and implementation. The number of participating fishers and their submitted reports demonstrated the success of the electronic reporting system; we collected over 600 electronic catch reports from 27 fishers in the U.S. Virgin Islands (USVI) and Puerto Rico (PR) over a period of nine months.

The final Digital Deck electronic catch report system included a catch report application (mobile and desktop) and dashboards for both the fishers (mobile and desktop dashboards) and the agency fisheries managers (desktop dashboards). Throughout the project we coordinated with fishers, agency fisheries managers, and regional data managers via in-person meetings and phone conferences. Initial onsite visits enabled the project team to recruit and train cooperating fishers in collaboration with agency partners. The project team continued training and support for fishers through later site visits and regular remote communication, and worked with both fishers and agency partners to ensure that the final product fit technology preferences and data requirements.

This final report details the progress made during the grant period towards approved objectives and the project results. Final grant financials have been submitted separately through the NOAA Grants Online portal, according to reporting guidelines.

Overview of Project Plan

This NOAA CRCP grant award supported Ecotrust and Point 97 to work closely with US Virgin Islands (USVI) fishers and Puerto Rico (PR) fishers, as well as with collaborators at the USVI Division of Fish and Wildlife (DFW), the PR Department of Natural and Environmental Resources (DNER), and the National Marine Fisheries Service Southeast Fisheries Science Center (SEFSC) in Miami, FL.

This modern information platform was designed to serve the needs of the fishing community and fisheries managers, foster and promote collaborative fishing efforts, better track and manage fisheries data, and empower fishers and fisheries managers to make better harvest decisions to minimize fishing impacts in coral reef ecosystems.

In collaboration with partners in St. Thomas, St. Croix, Puerto Rico, and Florida, Ecotrust and Point 97 worked towards five specific objectives during the project timeline:

1. Conduct a **needs assessment and technology feasibility study** with the St. Thomas's Association, researchers, and agencies to review and confirm data collection devices, platform usability, data collection parameters, access/data sharing agreements, and the thematic, spatial, and temporal synthesis of information.
2. **Develop platform components** (including mobile data collection, secure centralized spatially-enabled online relational database, and intuitive interface for spatial and thematic query and visualization of mapped and graphical results). Note: base level platform functionality has been developed through previous projects.
3. **Test and validate platform components with project partners.**
4. **Train five fishers in St. Thomas to use devices and platform.** *(Original target number was revised, based upon feedback from the NOAA program team and enabled by a complementary grant in support of this project received from the National Fish and Wildlife Foundation's Fisheries Innovation Fund. Ecotrust and Point 97 were able to recruit and work with 23 USVI fishers and four PR fishers).*
5. **Deploy system and evaluate functionality**, done in an iterative and collaborative manner with participating fishers and agencies.

Project activities to meet these objectives were outlined in five active phases over a 12-month timeline, as summarized below (the full detailed activities and timeline are available on pp. 10-13 of the approved full project narrative).

I. Needs assessment (months 1-3)
II. Product design (months 2-3)
III. Prototype implementation and release (months 3-7)
IV. Final implementation and release (months 8-12)
V. Final analysis of Digital Deck pilot (months 11-12)

The project team completed work towards objectives 1 and 2 during the first half of the project, and that work was detailed in Ecotrust's first semiannual report, submitted in January 2014. During the reporting period January-June 2014, the project team worked towards objectives 3, 4 and 5. Specific activities towards these objectives were detailed in our second semiannual report, submitted in July 2014.

Results and Outcomes

The final analysis of project outcomes includes project products and deliverables (see *Table 1*), and a discussion of the results of project activities, including outreach, and any associated outcomes.

Table 1: Proposed Project Products and Deliverables with Current Status
Ecotrust proposed the following specific products or deliverables for this project.

Product/ Deliverable	Associated tasks	Proposed submission	Status at this report
Digital Deck mobile app for iOS and Android	Workflow design, GIS data layer development, mobile app development, and final packaging and publishing for each platform.	End of project. To be published through the Apple and Google app stores.	**Incomplete:** Mobile app is not available in either store due to personal protected information (PPI) issues (see Remaining Tasks section, p. 8 of this report).
Digital Deck electronic catch report system server	Hosted Digital Deck server for submitting, aggregating, visualizing, and exporting logbook records for partner access. Includes database and server-side application development along with secure account-based access for submission and export of logbook data.	April 2014	**Complete:** Desktop application, dashboard, and databases are hosted and accessible by project partners.
Digital Deck catch report data. *Project partners will be able to export catch report data and import into their systems. Format to be determined based on the complexity of the final data. The simplest case will be a CSV or Shapefile. The most complex will be a Geodatabase, GeoJSON or XML.*	Development of the export feature for querying out the data and storing it in the appropriate format.	Available ongoing after end of project to project partners.	**Incomplete:** The export feature of the database is still under development. This important feature will be a priority in next steps for Digital Deck (please see Remaining Tasks, p. 8, and Next Steps, p. 10).
Digital Deck Pilot Project Summary Report	Report summarizing outcomes, lessons learned, and best practices from the pilot project.	September 2014	**Complete.** This final report serves as the project summary report.

Objective 1: Conduct Needs Assessment

We conducted outreach to gather data for our needs assessment and build the momentum needed to support fishers' and fisheries managers' adoption of a digital catch reporting system. Our outreach efforts in the US Virgin Islands and Puerto Rico resulted in a larger number of fishers participating in the pilot project than expected. Targeted outreach to fishers in USVI began in July 2013, and continued with fishers selected for the pilot project.

The original five project participants grew to a group of 27 participants (of these, 21 participants were able to finish the project and meet all expectations). Point 97 staff responded to this increase with a request to NOAA for project budget modifications to purchase additional equipment to accommodate the larger number of project participants.

The decision to conduct this outreach was strategically advantageous in that it:

1. Provided a wider array of fishers to test and refine the catch report app and system;
2. Increased the momentum, visibility, and traction of the project on the ground through greater fisher buy-in and adoption of the digital catch reporting system (which will also help advance this project to full implementation); and,
3. Provided a more robust data set for testing and refining the catch report summary dashboard so that fishery managers could track catch limits and summarize catch statistics.

We coordinated with participants through a series of on-the-ground meetings and events. Participant feedback from these events yielded strong evidence of a pressing need to collect catch reports electronically in the fisheries community. During the needs analysis, a process assessment based on interviews with fishers and fishery managers showed that the current paper-based catch reporting process is highly susceptible to data entry errors, incomplete submissions, and time lags that can adversely affect fisheries managers' ability to make decisions and guide sustainable resource management.

The primary outcome anticipated for this project was that the Digital Deck would improve the timeliness and quality of catch data that is readily available for analysis by fishers and fishery managers. The results of the needs assessment analysis provided the project team with key information to directly tie the development of Digital Deck to the reporting needs and changes identified by partners.

Objective 2: Develop platform components

The Digital Deck product consisted of four distinct parts: (1) the mobile application; (2) the desktop application, (3) the dashboard; and, (4) the federal database link. We received valuable user feedback for the mapping feature of the mobile application. We used this feedback to prioritize implementation strategies that would meet the usability needs of the largest number of users.

1. The **Digital Deck mobile application** was developed and actively used by 27 fishers, and 2 fishery managers, over 9 months of testing in St. Thomas, St. Croix, and Puerto Rico to provide improvement-based feedback. Over this time period, more than 600

electronic catch reports were collected, including test data from training and testing exercises, but a majority of the reports represented actual catch report data tied to real fishing events. The Digital Deck mobile application provided a convenient, easy-to-use mobile application submission tool for catch report forms managed by the agency managers (see *Figures 1-4* below). Using an iPhone, fishers opened the application via the touchscreen and logged in. Fishers would select whether they wanted to submit a new catch report, finish an existing catch report, or review previously submitted catch reports. Fishers could also view graphical summaries of any catch reports. Upon submission, all catch reports were saved in a hosted, cloud-based database.

Figures 1-4: Digital Deck Mobile Application Screen Examples

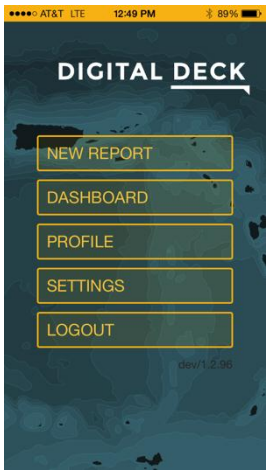


Figure 1: Digital Deck mobile application home screen

Figure 2: Digital Deck catch report species selection screen

Figure 3: Digital Desk fishing area selection

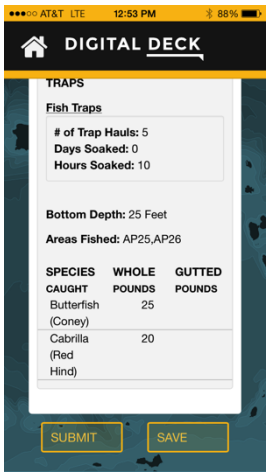


Figure 4: Digital Deck catch report summary/submit screen

2. The **Digital Deck Desktop Application** was released to fishers to test in March 2014 but received less attention and produced less feedback than the mobile application. This was not surprising, given that the mobile application was expected to be more convenient for most users. The Digital Deck desktop application is similar to the mobile application in authentication process, profile information storage, catch report, and catch report history, but is also accessible from any desktop browser as a web-based application.
3. The **Digital Deck Dashboard** (for fishers or fishery managers) was also released to project partners in March 2014, and was tested primarily by fishery managers in the USVI and PR. For fishers, the desktop dashboard added a map to visualize the spatial component of the individual fisher's history. Based on feedback in the field, we expect that this will continue to be a popular feature for fishers using the desktop application and dashboard for entry and submission of their catch report data. For fishery managers, the Digital Deck Dashboard provided a secure, online dashboard management interface to review submitted catch reports and track ACL progress in

real-time (see *Figure 5* below). Managers logged in to view charts that tracked ACL progress by species and region, view results for fish catch and gear use, and manage and review individual catch reports submitted by fishers. The dashboard permitted catch report entry for continuing paper-submitted forms and provided a communication tool that supported fishers' efforts to submit catch reports.

Figure 5: Agency Dashboard Screen Example

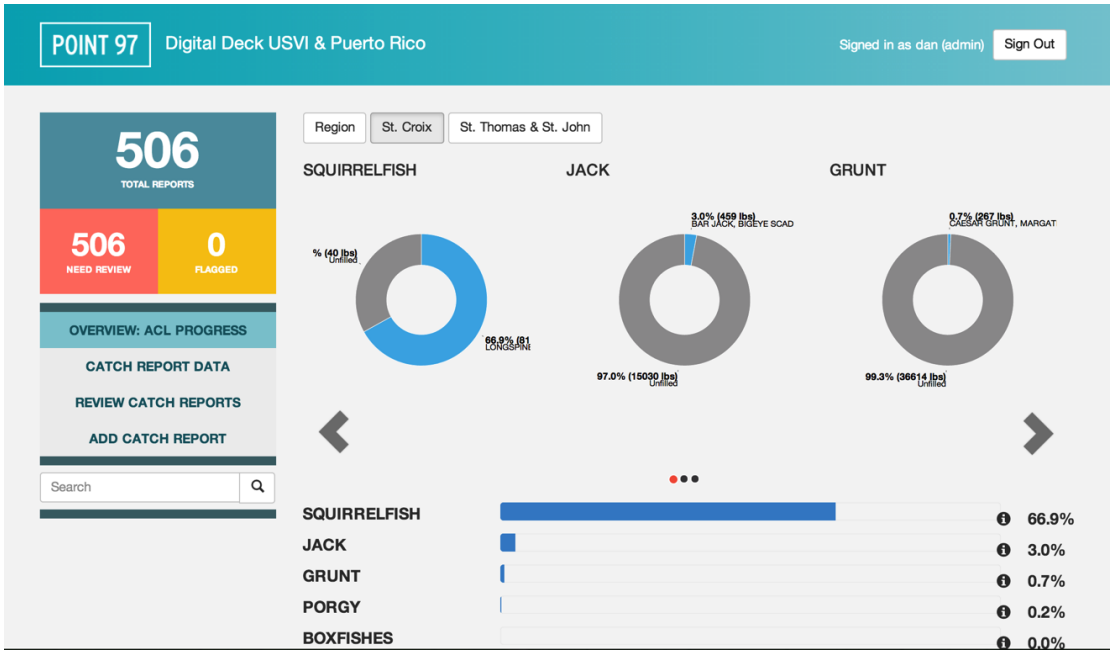


Fig 5: Screenshot of agency dashboard landing page with ACL tracking, links to review individual catch reports, and add catch reports for fishers that submit paper based reports.

4. The final component of the electronic catch report system **was coordinating with SEFSC fisheries scientists on data linking to databases at the Science Center**.

   Outreach activities provided Point 97 staff and project partners the opportunity to discuss topics surrounding linking, accompanying data standards, and database security. Linking the Digital Deck cloud-based database to the NOAA SEFSC database is a critical step toward integrated system success that will allow access to reliable and consistent data. It also ties to our secondary outcome for leveraging Digital Deck technology to foster social capital among various fisheries-related groups, and improve transparency and access to data. Early in the project, Point 97 staff visited the SEFSC offices in Miami, FL and had a productive initial conversation about database linking and demonstrating the latest release to the mobile application.

   Currently fisheries scientists manage large databases of catch reports and other resource management information. Once reviewed and approved by territorial fisheries managers, standardized data will be accessible to fisheries scientists so that they can

directly pull information from the catch report database into their own systems. Data standards, including species codes, gear type codes, fishing area designation, and entity-relationship diagrams have been shared with SEFSC and are currently serving as the foundation for current and future data linking activities. Coordination and communication to link the catch report database with the SEFSC databases is ongoing, and will be a central part of future Digital Deck work in the Caribbean.

Objective 3: Test and validate platform components

The mobile component of the Digital Deck electronic catch reporting system was beta-tested with 23 USVI fishers, four PR fishers, and two USVI DFW managers from October 2013 until June 2014. The beta-testing phase included the collection of over 600 catch reports from 29 users, and feedback from participants via phone, email, text, and face-to-face communication.

The beta-test provided us with invaluable feature and user experience feedback through an iterative process. Through this process, we were able to effectively implement informed changes in three updates to strengthen the application. These user-directed updates ensured that participants were more confident operators of the application, and we observed subsequent increases in report submissions with each new release. The clean, final system update was released in April 2014. The testing and validation phase results tie to our proposed outcome to engage fishers in the design of data collection methods. This iterative process also fostered fisher involvement in how their data could be used to support planning, implementation, and enforcement activities.

Objective 4: Train 5 fishers in St. Thomas

Training of 23 fishers in the USVI occurred first in October 2013, and training of four fishers in Puerto Rico occurred during March and April 2014. Most participants were familiar with how to operate smart phones with touch screens, but a handful or participants did require more thorough instruction on how to use smart phone devices and the Digital Deck application.

In both the large groups and one-on-one trainings, however, we did observe that the fishers were generally quick to demonstrate proficient use of the touch screen technology and the Digital Deck mobile electronic catch reporting application. Ever-increasing catch report submissions also evidenced that the trainings were successful and that interest in the application was retained. These results link to our outcome for Digital Deck as an avenue for easier, improved fisher access to electronic methods for collecting timely, high-quality catch data that can be shared with the wider fishing community.

During the course of the project, intra-fisher communication and outreach emerged, as non-participating fishers continually approached us to find out how and when they could submit their own reports electronically. With this interest, we are eager for the opportunity to expand Digital Deck outreach efforts that foster social capital within the fishing community and strengthen local participation and support of natural resource management functions for electronic catch reporting.

Objective 5: Deploy system and evaluate functionality

The final version of the Digital Deck system, including all four components, was implemented and released to island fishers in the USVI and PR in April 2014. Throughout the release stages of the Digital Deck system, participating fishers and agencies were able to efficiently capture high-quality data through the easy-to-use mobile platform and perform real-time tracking and monitoring of fishery quotas or limits such as Annual Catch Limits (ACLs).

Over the last months of the project, the project team collected additional feedback from partners on features and the user experience, and we will continue development of the system during the next steps and expansion of the project.

Final feature and user experience feedback were collected and prioritized into a development "wish-list." In the final months of deployment and evaluation, we were able to identify several components that required additional testing, specifically the agency dashboard and fisher desktop dashboard and application. These evaluation feedback loops all connect with the intended outcome for greater engagement of fishers in the design of how data will be collected so that the Digital Deck system can best serve the needs of all users and user groups.

Remaining Tasks

At the time of project completion, the following tasks were not fully complete:

- **Linking the Digital Deck database with the SEFSC database**: Undeveloped data standards for the databases made linking between systems a challenge, and resulted in a delay on the expected timeline for this task. However, discussion is on-going with federal partners, and we are optimistic that this task will be completed in the next phase of the project (beyond the scope of the present grant).
- **Ensuring consistent data links for government agency use:** Territorial government agencies had access to the Digital Deck dashboard, but were not using it in an official capacity mainly due to the incomplete link to the federal databases. Testing was done on the territorial agency dashboards, but going forward additional tests will be needed to ensure that the territorial agencies can accept, review, and edit catch reports, communicate with fishers, and ultimately pass accepted data on to the SEFSC.
- **Developing final components for Android system, and incorporating final feedback**: Development on the mobile application was focused in the Apple environment (iPhone) to ensure product quality and project timeliness, and so final development on the Android system is needed. Feedback collected during final evaluations by project partners will also need to be developed on both Apple and Android operating systems.
- **Offering the application in an accessible and public store:** Neither the App Store (Apple) nor Google Play (Android) offers the Digital Deck mobile application at this time. It was determined that personal protected information (PPI) would be needed to ensure that accounts to use the application are only created by authorized users (fishers) to avoid spam entering the database. Currently, anyone with access to the Digital Deck application can create an account and submit data to agency managers. Based on the need to maintain clean and accurate data, Point 97 restricted download of the application so

that it cannot be accessed by the general public. Discussion has been ongoing since spring 2014 to determine whether and how Point 97 would secure PPI, or if agencies would manage this aspect of the project.

Project Challenges and Lessons Learned

This section includes discussion of what worked, what did not, and thoughts on the potential for this pilot project to grow into an established practice of data collection and reporting in the Caribbean. The challenges experienced during the Digital Deck Pilot Project offered Ecotrust and Point 97 staff the opportunity to reflect on the future needs and considerations to expand this work in the Caribbean and to advance the future development and implementation of electronic catch report systems in general.

Coordinating a project and maintaining partner relationships from a long distance was a challenge, given the technical nature of the conversations that were required and the often unpredictable schedules of fishers. These challenges revealed an opportunity for future development, however, as we see a need for fishers to have access to resources and support from on-island staff who know the local fishing community and can address immediate technical device issues and answer general catch report questions. Currently, territorial agencies are hard-pressed to support fishers' use of an electronic catch report system due to limited staffing in general, and limited opportunity to develop specialized technical proficiency. Building agency capacity to offer well-trained, on-island staff would improve fishers' efforts to fully participate in an electronic reporting program.

During our pilot, at least two fishers dropped out due to personal issues, and another six did not fully comply with the expectations laid out in the Participant Agreements (see *U.S. Virgin Islands Digital Deck Pilot Project Fisher Participation Agreement*, included in the supplementary attachments to this report). Fully-trained, on-island staff members who best understand local community fisheries and contexts would be better equipped to identify and address factors contributing to attrition rates. Dedicated staff trained in the Digital Deck system would be a great resource for fishers and could consistently spend time with them to build rapport, troubleshoot any issues, and ensure that catch reports are submitted in a timely manner.

We also heard from many pilot project fishers that the requirement of reporting their catches twice (once electronically and once on paper), was a source of irritation. We could not avoid this requirement for our pilot, because some crossover was necessary while developing and testing a new system, but for future projects we will consider ways to streamline data submission during pilots or feasibility studies to prevent participant fatigue.

Coordinating logistics related to mobile devices and cellular service for application testing and data collection also presented some challenges for the project team. One device was accidentally damaged (but was replaced), and prepaid services proved difficult to centrally manage from a remote location for 29 smart phones. These logistical responsibilities will be removed from Point 97 project staff when fishers use their own mobile devices (mobile application) or home computers (desktop application). For this pilot project, fishers were provided iPhones to access the mobile Digital Deck application. This was not the preference for some users, as the screen

and keyboard size were not deemed large enough. Allowing fishers to use personal devices of their choosing will help to alleviate this issue in the future. We also recognize the importance of developing an Android version of Digital Deck to allow non-iPhone users the ability to download the application through appropriate online app stores.

Next Steps

The pilot project successfully demonstrated the capabilities of the Digital Deck system to provide fishers and fisheries managers with high quality data, to improve the timing of data for in-season management, and to increase collaboration and communication among fishers and agencies. The project also revealed that both fishers and agencies have an interest in and enthusiasm for an electronic reporting system that can meet the needs of both groups. Digital Deck can also be used to collect and disseminate data to support a variety of outreach activities, including intra- and inter-community discussions among fishers and fisheries agencies regarding the benefits of participating in scientific and reporting activities, and the advantages of widening and strengthening local participation and support of natural resource management functions.

The next steps for adoption should include:

1. Growing the pool of system users both for the mobile and desktop applications;
2. Creating a roadmap for broader implementation; and,
3. Ensuring agency confidence in data links and quality.

To grow the pool of users, we recommend public meetings, workshops, and other outreach efforts coordinated through the pilot project partners. We will continue the conversations with both territorial governments and the SEFSC to ensure that databases are talking to one another correctly, and to fully develop and meet data standards for the system. The roadmap should be drafted with the guidance of all project partners especially the agencies, and include what steps should be taken to codify an electronic catch reporting system and should also include a timeline for implementation. To codify a system like this, we expect the discussion to center around what policies, regulations, and/or laws should be created to support the transition of current systems and to make this a viable option for fishers. We recommend that project partners capitalize on this early investment and momentum for Digital Deck in the region and begin considering the necessary steps to adopt the system.

Point 97 presented Digital Deck to the full CFMC council meeting in April 2014 to keep the CFMC officially informed of the project and recommended next steps. This presentation included an update on the pilot project, lessons learned, and recommendations for next steps for the technology (see *USVI & Puerto Rico Digital Deck Pilot Project: Project Update,* included in the supplementary attachments to this report). Discussions have continued, and are on-going with both federal partners at the SEFSC and with territorial agencies.

It will remain important to involve partner communities to determine the most appropriate ways of measuring impact within their specific contexts. We are pleased with the results of our outreach efforts thus far, and are confident that once territorial or federal policies are in place to support this electronic catch report system as a viable alternative to paper reports, there will be

broader participation and future successes to support sustainable fisheries management in the Caribbean.

Supplementary Attachments

The following documents are included as supplementary attachments to this report:

Project Documents:

- ***Caribbean Digital Deck Needs Assessment***: Documentation of needs assessment findings (Objective 1 of Pilot Project).
- ***U.S. Virgin Islands Digital Deck Pilot Project Fisher Participation Agreement***: A blank copy of the agreement signed by all participating fishers, outlining project overview and role of participant fishers.
- ***Digital Deck™ U.S. Virgin Islands and Puerto Rico***: Brochure explaining Digital Deck development and implementation in the USVI and Puerto Rico.
- ***US Virgin Islands & Puerto Rico Digital Deck™ Expansion***: Outreach tool summarizing the Digital Deck work to date and future development plans for current and potential partners and funders.

Presentation:

- ***USVI & Puerto Rico Digital Deck Pilot Project: Project Update***: April CFMC presentation that included an update on the pilot project, lessons learned, and recommendations for next steps for the technology.

Media:

- ***From Paper to Digital—The Mobile App Revolution***: Invited blog post on National Geographic described the typical day of a fisher in St. Thomas and explained how Digital Deck can improve workflow and management of the fishery.

Caribbean Digital Deck Needs Assessment

December, 2013

I. Identify roles and responsibilities between project partners.

Ecotrust (Point 97)

- Charles Steinback is the Principal Investigator and he is providing project planning and oversight.
- Megan Mackey is the Ecotrust Project Coordinator and she is working to coordinate the project.
- Jenny Walsh is the Point 97 Product Director and she is working to coordinate the project, lead the development team, and work on a final project analysis and wrap-up.
- Cheryl Chen is the Project Manager and she is managing the project budget, coordinating staff time, and helping with ongoing project analysis.
- Dan Crowther is the Project Coordinator and he is conducting outreach to and field-testing with project partners and participants.
- Scott Fletcher and Edwin Knuth are the Application Developers tasked with developing the Digital Deck software for this project.

USVI Division of Fish and Wildlife (DFW)

- Director Roy Pemberton is overseeing the involvement of DFW in this project.
- Juan Cruz is coordinating fisher outreach and communications in St. Croix.
- Mekisha George is coordinating fisher outreach and communications in St. Thomas.

Puerto Rico Division of Natural and Environmental Resources (DNER)

- Helena Antoun is the Fisheries Liaison for the DNER and the Caribbean Fisheries Management Council. She is helping to facilitate outreach to fishers and DNER staff in Puerto Rico.

Puerto Rico Fisheries Associations

- Carlos Velasquez heads up the Puerto Rico Fishing Association, and he is helping to coordinate outreach to fishers in Puerto Rico.

Southeast Fisheries Science Center (SEFSC)

- Steve Turner heads up the Fisheries Statistics Division at NOAA's SEFSC, and he is the main point of contact for this project.

NOAA Fishery Liaison

- USVI: Lia Ortiz
- Puerto Rico: Glenis Padilla

Lia and Glenis help to conduct initial outreach to fishers in the USVI and Puerto Rico and facilitate introductions.

II. Identify current software systems in use by collaborating agencies and how information flows from fisher to end products.

Fishers submit paper catch report forms for each fishing trip to USVI DFW or PR DNER staff, depending on location. Agency staff manually enter the catch report information into their system to submit to the SEFSC, where it is used to inform the fishery management plans that govern Caribbean fisheries. Agency staff receive monthly data reports that consist of cumulative data dumps of all catch report data submitted. Agency and SEFSC staff communicate verbally or via email to address data quality issues.

III. Summarize overall problem(s) and perceived solution(s).

Data collection and delivery methodologies introduce data relevancy and accuracy obstacles for annual catch limit (ACL) management decisions and actions. Fishers are required to report using a process separate from their fishing activities. Catch report forms introduce potential inaccuracies in reporting, reducing confidence in the data. Once reported, fishers do not have access to information that connects their harvest activities with the larger ACL progress. Agency staff hand-enter paper reports, introducing possible errors, and staff shortages often slow the frequency of this activity. Agency staff also do not have immediate access to entered data and so are not able to make real-time ACL management decisions on aggregated catch report information. Disconnected from the fishers, scientists rely on communication with agency managers but suspect, based on process understanding, that the reports they received are de-coupled from the harvest realities by both time and reporting accuracy. Overall confidence in the information from fishers to scientists is low. The goal of managing for annual catch limits is not being as thoroughly addressed as desired by all parties.

A solution that increases the speed of delivery and reporting accuracy and ties that higher-quality information directly to ACL progress would build confidence throughout the fishery. Components of the solution would include collecting data at the source – the fishers while they are fishing – and transmitting that data electronically directly to fisheries managers for their review and aggregated visual analysis. Agency managers can then submit reviewed information directly to scientists at an accelerated rate for their fisheries management research and decisions, while, at the same time, monitoring the progress within their own region toward ACLs. With better information at hand, scientists could more easily propose management adjustments to catch report collection forms. Editing and distribution of those changes would be immediately distributed region-wide.

IV. Identify Digital Deck system requirements and platform components, including:

a. **A mobile data collection client.** Mobile data collection will occur using mobile smart phones supplied to the fishers in waterproof cases along with data plans necessary to handle data communication. A compatible mobile catch report application will be developed and installed on the phone and then automatically update as improvements

are made. Catch reports recorded on the smartphones will be submitted from the fishermen directly to the database (b).

b. **A secure centralized geospatial database that will allow for spatial and thematic query and visualization of mapped and graphical summaries of fishery harvest activities.** Catch report data will be stored securely in a PostgreSQL database on dedicated, virtual hosted servers in the Cloud. Management dashboards will be developed for fisheries agency managers to authenticate to for catch report review, approval, and visualization based on fisheries management variables, particularly ACLs. Fishers will also be able to authenticate to view their own catch reports, total harvest by species, and their history of fishing areas. Fishers can also view regional progress toward ACLs, improving their business decisions.

c. **The ability to transfer and consume information to requisite agencies for further analysis and management purposes.** With reviewed, approved catch report information stored in a centralized, Cloud-based database, agencies, scientists, and policy managers have on-demand access to data. Catch report information can be pulled into larger databases to increase analysis potential and value.

V. Survey and assess fishers' typical fishing practices in relationship to data entry, including access to technology and internet services in each location. Identify potential hurdles to overcome and provide recommendations for successful implementation.

With regard to data entry, the typical practice in both the USVI and Puerto Rico is for fishers or their wives to enter catch report information on paper forms provided by the USVI DFW and the PR DNER after each fishing trip. Forms have to be turned in to agency offices which are often at the far end of the island, requiring a special trip or postponement until a planned trip. Agency staff then enter the written data into the computer system.

Many fishers have access to and currently use smart phones, and so are familiar with the technology and with downloading and using applications. Internet services are provided by AT&T.

Hurdles to overcome include:

- Gathering regular feedback from fishers on problems they encounter when using the Digital Deck app.
- Addressing those problems in a timely fashion and getting the app updated and re-loaded on all of the fishers' phones.

These hurdles can be overcome with regular communication with project partners and fishers, working together to determine solutions that will work most efficiently for everyone.

VI. Define the explicit use cases for the system by fisher and collaborating partners. Refine and prioritize based on what can be accomplished under the available timeline and budget.

A fisher leaves his homeport and fishes for the day using the fishing gear that he normally uses. On the way back to his landing site, he pulls out his phone, presses the app icon, taps in his username and password, and, by progressing through the guided screens, quickly submits his catch report while depth ranges, areas fished, whole and gutted weights, and by-catch details are still fresh in his mind. He scans the report as a final review and then taps on submit. He lands, unloads his catch, and heads home at the end of the day. *Accomplishable within the available timeline and budget.*

A fisher leaves his homeport but decides to fish off of a different island than his usual area. He decides to land his catch at a different port. On his way back in, he pulls out his phone and has immediate access to the correct catch report form for the island he rarely visits. He submits his information on his way to the dock, unloads his catch, and then returns to his homeport. *Accomplishable within the available timeline and budget.*

After using Digital Deck the previous season, a fisherman begins planning for the next. He pulls out his phone and logs in to the Digital Deck app. He visits the dashboard and calls up his summary reports. He filters the dates and quickly views catch data. He sees a species he had success catching and clicks on it. A map appears that displays the last year's areas of success. He starts to formulate his plan. *Accomplishable within the available timeline and budget.*

A fisheries manager arrives at the office. Over his morning coffee, he opens a web browser and logs in to the Digital Deck dashboard. He sees charts that display the percentage of Annual Catch Limits (ACL) that have been harvested so far for the season across the region. He sees the number of catch reports submitted over the weekend that need review and clicks to get a filtered list of those catch reports. Clicking on one, he scans the report for inconsistencies or errors. Noting some, he clicks the Flag button and quickly types a short message to the fisherman asking him to give him a call when he gets in from fishing. The fisherman will get a text message and alert on his app letting him know he has a message. Moving on to the next catch report, the fisheries agent sees that it looks good and clicks the Approve button. The data is merged with the reviewed catch report data and the ACL charts on the fisheries manager's dashboard are immediately updated. *Accomplishable within the available timeline and budget.*

A scientist at the Science Center is putting together a stock assessment study for the islands. She wants to be sure she is working with the most recent, correct data. She runs a pull request on an established data link from the catch report database to the Science Center database. All data sync by appropriate species and gear codes and align with the correct fishing area codes. She sees that the most recent submitted data is from the previous day. In the course of the stock assessment, the scientist notices a particular fish, not officially on the catch report, that is frequently reported under the "Other" field. She wants to improve the catch report data for this species so sends a message to the fisheries manager on

the island to add the FIN code and local name to the electronic catch report form. The fisheries manager does so that afternoon and publishes the updated catch report. As fishers are coming in that day, they get an alert that a new version is available. They click the link, log in again, and now see that new species to officially report on. Fishers that had previously not focused on reporting their Other catch are now formally reminded to add weights for this species. The catch report data grows more accurate. *Accomplishable within the available timeline and budget.*

VII. Document the assumptions and limitations of the pilot Digital Deck system.

Assumptions:

- That fishers will submit catch reports more often and more reliably using the Digital Deck app because it takes less time, they are motivated by continued access to past catch report data, and delivery to the DFW/DNER offices is easily incorporated into their daily workflow.
- That communication between fisheries managers and the fishers will improve because each has real-time access to aggregated information and is spending less time doing basic data entry. Communication will hopefully be more fact-based and solution-oriented rather than task-based or directed at gathering basic information.
- That scientists will have increased confidence in the agency-submitted data because they and the fisheries managers have a common data platform to work from that is directly connected to submitted catch reports, up-to-date, and tied to spatial and metric-based analysis.

Limitations:

- The number of fishermen using the Digital Deck app in this pilot study is a fraction of the total number of fishermen on the islands. As a result, anticipated improvements in both accuracy and speed of the catch data and ACL reporting will be difficult to clearly detect. It will be important to gather verbal and anecdotal feedback from the fishermen and to distinctly examine catch reports between years for the fishers that participate to improve assessment analysis.
- That hurdles to introducing technology to a culturally central industry and way-of-life are not addressed as part of this project to pave the way for buy-in, increased adoption, and long-term use.

U.S. Virgin Islands Digital Deck Pilot Project
Fisher Participation Agreement

Project Description:

Together with partners in the Caribbean, Ecotrust is engaging in a one-year project, starting July 2013, to develop, test, and implement an electronic catch report application to support collaborative fishing efforts, better track and manage fisheries data, and provide information that can aid harvest management decisions. The tool is being designed to meet the expressed needs of community fishing organizations across the United States working to address common challenges. Digital Deck will allow for timelier and higher quality data to enable fisheries managers to more effectively monitor regulations, such as Annual Catch Limits, to better support sustainable fisheries in the Caribbean. In addition, the tool provides real-time access to catch information so fishers can use it to supplement the management of their businesses.

The project includes working with fishers in St. Croix, St. Thomas, St. John and Puerto Rico, and collaborating with local Fisheries Associations, the USVI Division of Fish and Wildlife, the Caribbean Fishery Management Council, and NOAA Fisheries. The following is an agreement between Ecotrust and the fisher which is subject to termination by Ecotrust based on non-compliance with duties agreed to by the fisher and may be terminated by the fisher at any time for which compensation will be withheld.

Fisher Participation Agreement:

I, _____, agree to participate in the USVI Digital Deck Pilot Project with Ecotrust. I understand that participation includes:

- Testing a new electronic catch report application on a smart phone during at least **5** fishing trips, with the intent to continue using and testing the app during additional fishing trips throughout the 1-year project duration.
- If I do not have a phone then one will be provided to me for the duration of this project.
- Providing feedback to Ecotrust staff on the application, including suggestions on how to improve it.
- Being available for follow-up calls and meetings regarding the project.

I also understand that my participation in this project includes compensation up to $300, to be paid to me at the completion of the project in July 2014.

Printed Name: _____ **Printed Name**:_____
(Fisher) (Ecotrust Representative)

Signature: _____ **Signature**:_____
(Fisher) (Ecotrust Representative)

Date: _____

Email: _____

Phone #: _____

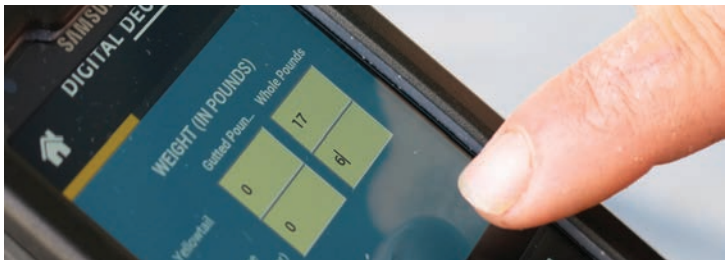
Address: _____

Fishing Gear Used: _____
(Nets, Line, Pots, Scuba, etc.)

Digital Deck™ U.S. Virgin Islands and Puerto Rico

The Problem

Fishermen and fisheries managers in the U.S. Virgin Islands (USVI) have expressed a need for a complete and real-time approach to accessing fishery harvest information. Proactive, collaborative fisheries resources management require near-to-real time data to deliver long-term economic and biodiversity health.



Working closely with fishermen and fisheries in the US Virgin Islands, Point 97 designed the Digital Deck™ platform, a data collection and reporting tool designed to transition legacy, manual and error prone data practices into reliable fishery harvest data. Digital Deck™ delivers a simple, easy-to-use interface via cell phone, tablet or computer technology, enabling fishermen to digitally collect their harvest data and easily transmit the data to fisheries managers.

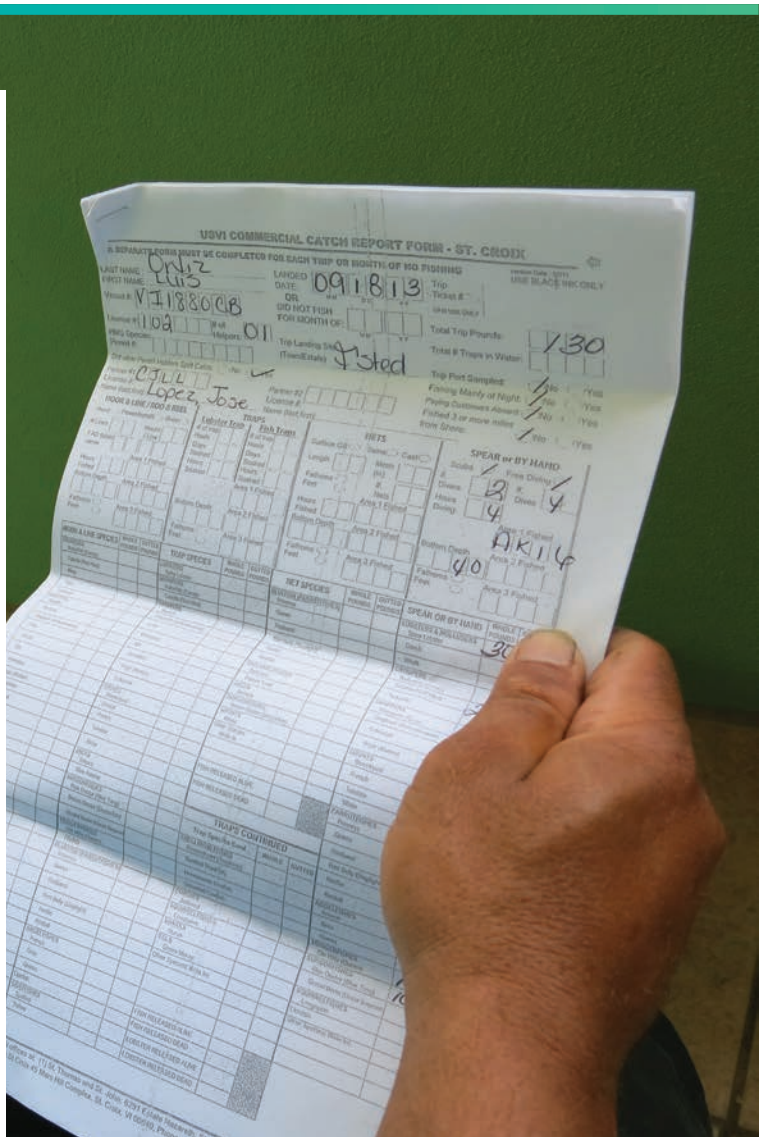
Tracking fish harvest in near-to-real time ensures that USVI fisheries managers can assess harvests in relation to established Annual Catch Limits, and that fisherman can monitor their catch totals against catch quotas. USVI fishermen have the added benefit of accessing their historical trip data, informing future business planning. Over time, Point 97's Digital Deck™ platform promotes collaborative fishing efforts among fishermen, better tracking and management of fisheries data, and adds market value to seafood, while empowering fishermen to make better harvest decisions.

Rethinking Paper Catch Reports

Most fisheries managers and fishermen would acknowledge paper logbook reports and manual data entry is time consuming, inefficient, and lacks historical track-back methods for management and fishing business optimization. Translating and digitizing the dense paper catch reports is the first step towards creating resource management efficiencies. In the case of USVI, the Point 97 team analyzed the paper catch report forms currently used across St. Thomas, St. John, St. Croix and Puerto Rico, respectively. Recognizing each paper form supports dense and unique data entry points covering all of the main types of fisheries (hook and line, traps, nets, spear/hand), the Point 97 team broke these forms down into smaller groups of questions, documenting the validation required at each step of the fisherman's input.

Using Digital Deck™'s built-in authoring tool, the Point 97 team created electronic versions of each catch report form. The easy-to-use authoring interface allows the USVI fisheries manager to build digital catch report forms by adding and editing questions, re-arranging and grouping questions, and defining constraints and validation checks necessary along the way.

Collaborating with fisheries managers, the Point 97 team creates question sets designed to be responsive to fishermen's answers. For example, if a fisherman indicates "lobster harvest" on an initial question, a secondary question is triggered ''number of lobster trap hauls" as a follow-up question, including a keypad to fill-in numeric answers. This sets up fast, easy and accurate data entry, contributing to strong fishermen engagement.



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Multiple Access Methods

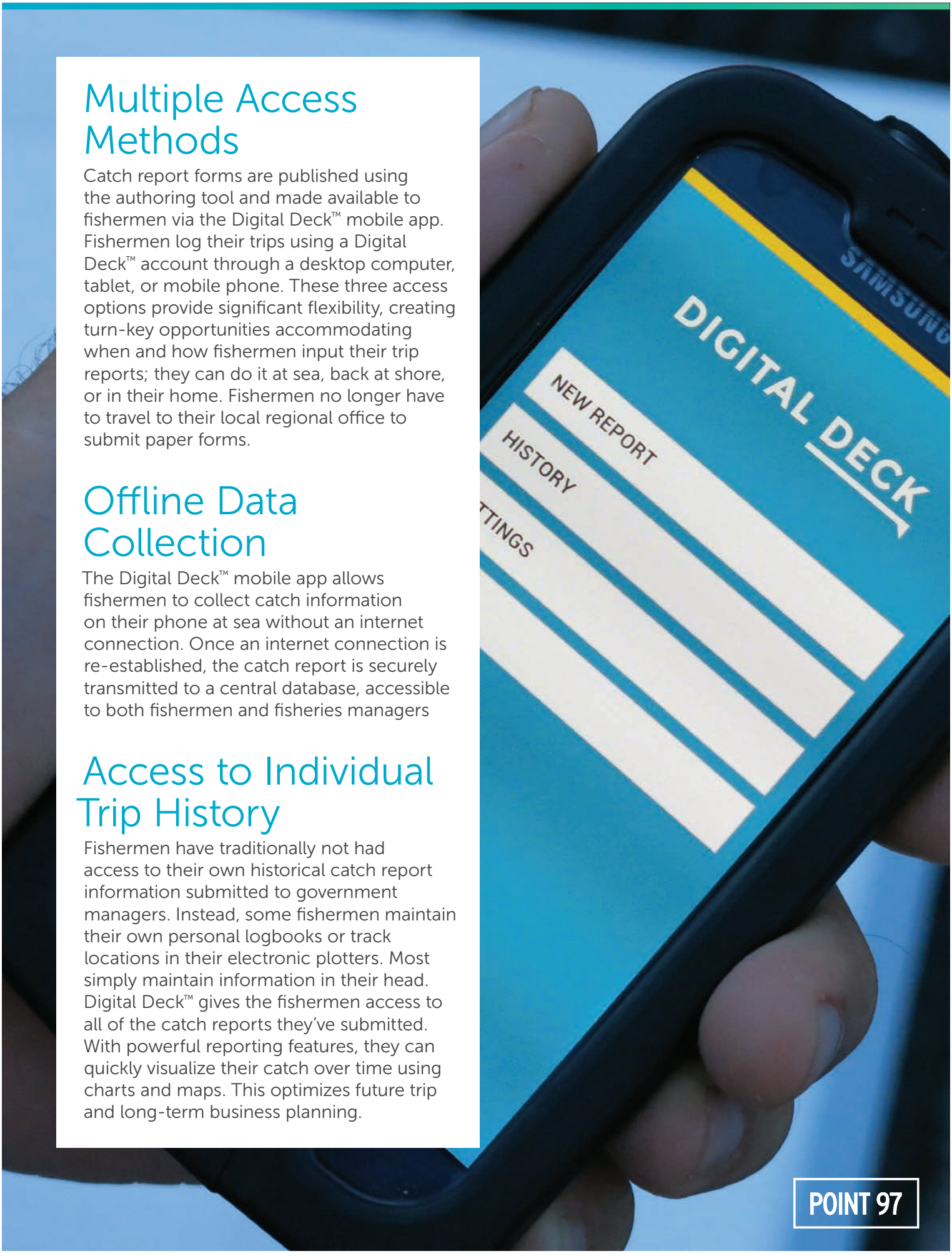
Catch report forms are published using the authoring tool and made available to fishermen via the Digital Deck™ mobile app. Fishermen log their trips using a Digital Deck™ account through a desktop computer, tablet, or mobile phone. These three access options provide significant flexibility, creating turn-key opportunities accommodating when and how fishermen input their trip reports; they can do it at sea, back at shore, or in their home. Fishermen no longer have to travel to their local regional office to submit paper forms.

Offline Data Collection

The Digital Deck™ mobile app allows fishermen to collect catch information on their phone at sea without an internet connection. Once an internet connection is re-established, the catch report is securely transmitted to a central database, accessible to both fishermen and fisheries managers

Access to Individual Trip History

Fishermen have traditionally not had access to their own historical catch report information submitted to government managers. Instead, some fishermen maintain their own personal logbooks or track locations in their electronic plotters. Most simply maintain information in their head. Digital Deck™ gives the fishermen access to all of the catch reports they've submitted. With powerful reporting features, they can quickly visualize their catch over time using charts and maps. This optimizes future trip and long-term business planning.



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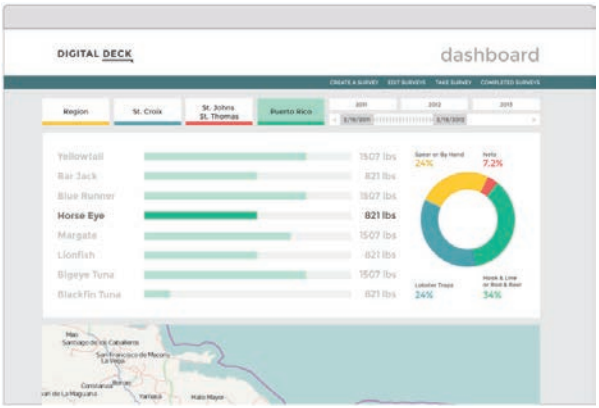
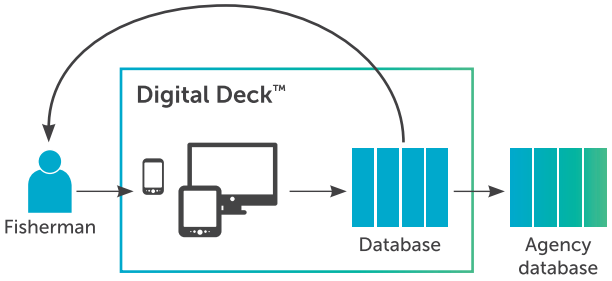
Planning Dashboard

As catch reports come into the system, they are immediately available for real-time reporting. Instead of waiting for paper forms to be processed, agencies can immediately begin acting on the information. Whether it's tracking quota limits for the year or comparing volumes of fish harvested by gear type over the last few months, fisheries managers can make informed decisions toward their resource management goals.



Connection to Agency Databases Creates Equity and Balance

Once catch reports are submitted using Digital Deck™, they are transmitted electronically to the official agency database already in place within the NMFS Southeast Fisheries Science Center. Digital Deck™ provides a secure electronic point of entry to this database. It ensures fishermen can continue to access their unique catch history and agency data, while simultaneously delivering an equitable platform for sharing aggregated information between all parties involved. All of this fulfills Point 97's mission of using better information sharing to drive more strategic economic development and resource management.



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TECHNOLOGY SOLUTIONS FOR OCEAN MANAGEMENT

an ecotrust *company*

GET IN TOUCH

CALL 503.467.0785
EMAIL info@pointnineseven.com
URL pointnineseven.com

US Virgin Islands & Puerto Rico Digital Deck™ Expansion

Traditional paper data collection methods for fisheries are error-prone and inefficient. Paper surveys can be damaged, lost, and require significant staff resources to manually enter information into databases. Digital Deck is designed to address these capacity deficits by applying mobile technology to collect fisheries data, combining data capture and visualization capabilities to support highly targeted management decisions.

Phase 1 of the Digital Deck Pilot Project began in July 2013 with funding from National Fish and Wildlife Foundation Fisheries Innovation Fund (NFWF FIF) and the NOAA Coral Reef Conservation Program (NOAA CRCP), and in partnership with the U.S. Virgin Island Division of Fish and Wildlife (USVI DFW), the Puerto Rican Division of Natural and Environmental Resources (PR DNER), the Caribbean Fishery Management Council (CFMC), NOAA Fisheries and the NOAA Southeast Fisheries Science Center (SEFSC), and USVI and PR fishers.

Milestones for Phase 1		
Assessment of needs, and the design of the digital system to replace the current paper catch report and manual entry database.	Training and implementation of Digital Deck with 27 fishers on St. Croix, St. Thomas, and Puerto Rico.	Dashboard designed to allow agencies to access, review, and approve catch report data.

Phase 2 of the Digital Deck project involves three main components as detailed below:

Expansion of Digital Deck

Expanding use of the Digital Deck system includes registering 30 additional fishers in Puerto Rico and USVI who already own an iPhone/Android phone or who can access Digital Deck through a web-based portal, increasing the number of catch reports submitted to the database, and developing regional capacity to train fishers and provide accessible technical support. This expansion allows us to gather critical feedback from a larger pool of users that will prepare the platform for wider adoption in the region. To provide on-island technical and logistical support for this expansion, hiring two part-time staff is required – one in Puerto Rico and one in the USVI. At the end of the project period the goal is to have at least 57 fishers actively using Digital Deck with an average of 150 reports submitted each month by fishers.

Roadmap to Implementation

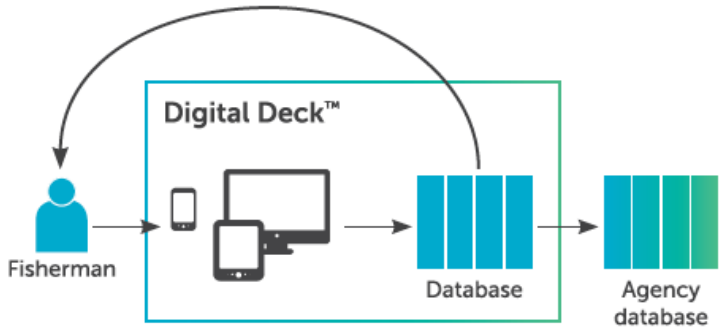
A fully implemented and integrated Digital Deck system allows participants to legally submit digital catch report data. To this end, a roadmap will be produced in coordination with local and federal partners. The roadmap will identify the timing, database integration steps, technical on-island support, as well as agency policies, regulatory, and legal mechanisms necessary for successful adoption of the data collection technology. Outreach efforts with fishers and fishers' associations will provide grassroots publicity on the utility and simplicity of the Digital Deck system. The PR DNER and USVI DFW will be partners in development of uniform policies on use of the Digital Deck system. Finally, federal partners at NOAA Fisheries and SEFSC will assist in developing data and database standards for linking the cloud-based database with federal databases.

Continued Digital Deck Development

Opportunities to improve the mobile application and dashboards continue to emerge. Below is a short list of the targeted updates and additional features for Phase 2 of the Digital Deck Program.

- Develop an Android compatible mobile app
- Make the app available through iTunes and Google Play app stores
- Enhance mobile data visualization features for improved understanding on-the-go
- Prevent unauthorized data submission through security process
- Expand data collection to include lunar cycles, water quality, habitat, water depth ranges and more
- Integrate new data standards as they are released by the SEFSC
- Optimize by-catch and whole/gutted pound data collection strategies
- Improve fisher use analytics for agency managers
- Capture trending analysis for agency managers
- Improve ACL metrics and analysis

Phase 3 of the project includes the implementation of the roadmap, final development of the enterprise system, outreach activity for full regional adoption of the Digital Deck system, and expansion of the digital catch report program to as many commercial fishers as possible.



Funding

We are currently seeking funding to support Phase 2 of the Digital Deck project. The total estimated cost of Phase 2 to implement all three components is approximately $375,000. Point 97 has submitted a proposal to the National Fish and Wildlife Foundation's Coral Reef Conservation Fund for $75,000 to support this project, however, additional funding sources are necessary for:

- Expansion/On-island support $145,000
  - Includes two part time staff for on-island support: $60,000
  - Phase 2 expansion efforts will target fishers who already own an iPhone/Android phone or who can access Digital Deck through a web-based portal and so the cost estimates do not include the purchase of cell phones and data plans.
- Roadmap for implementation $120,000
- Continued development $110,000

Get in Touch

Charles Steinback, Director
charles@pointnineseven.com
(971) 404-5632 | pointnineseven.com

POINT 97

Technology Solutions
for Ocean Management

USVI & Puerto Rico Digital Deck Pilot Project

Project Update

April 22-23, 2014

Ruby Gates, Charles Steinback

An ecotrust company

Goals

Develop, test, and implement an electronic catch report system to support:

- Collaborative fishing efforts
- Improve tracking and quality of fisheries data
- Aid harvest management decisions (ACLs)
- Provide fishers access to personal catch information for fishery and business management
- Lead the field in electronic reporting

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Phase 1

Worked with fishers to design a digital platform to replace current catch reporting system

- Key features identified
- Developed for user experience

Recruited and trained commercial fishers

- 15 on St. Thomas
- 7 on St. Croix
- 4 on Puerto Rico

Dashboard designed to allow agencies to access, review, and approve catch report data

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Partners & Timeline

Partners

- St. Croix, St. Thomas and Puerto Rico Fishers
- USVI Division of Fish & Wildlife, PR Department of Natural & Environmental Resources, Caribbean Fishery Management Council, and NOAA Fisheries and Southeast Fisheries Science Center

One year project, began July 2013

- Months 1-3: Needs assessment
- Months 2-3: System design
- Months 3-7: Prototype & testing
- Months 8-12: System expansion, next steps

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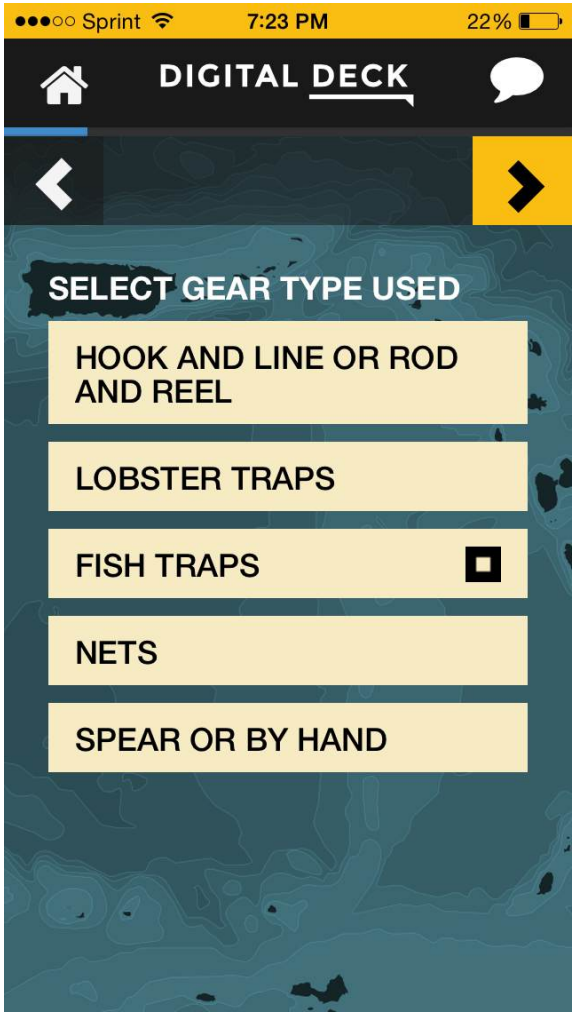
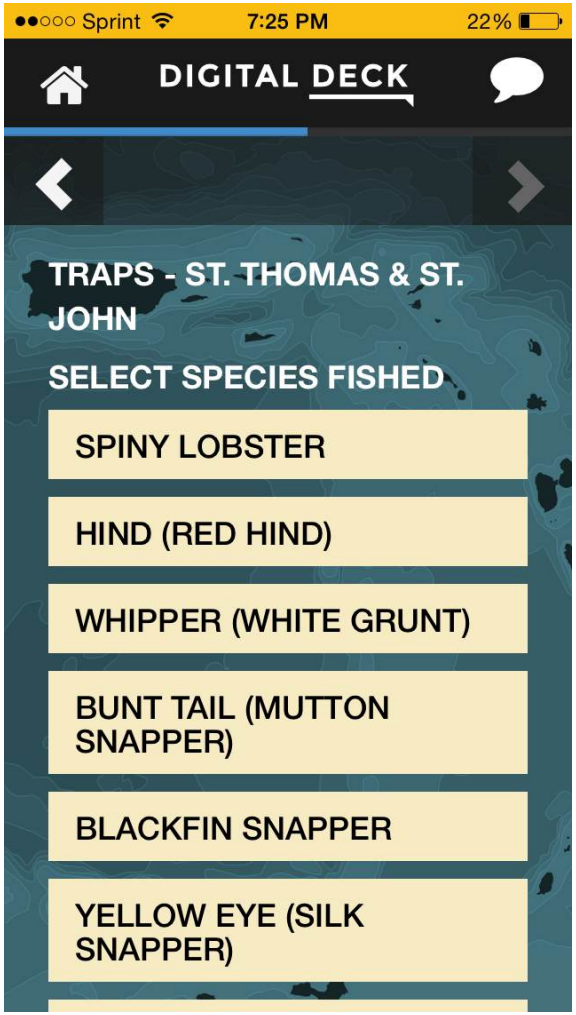
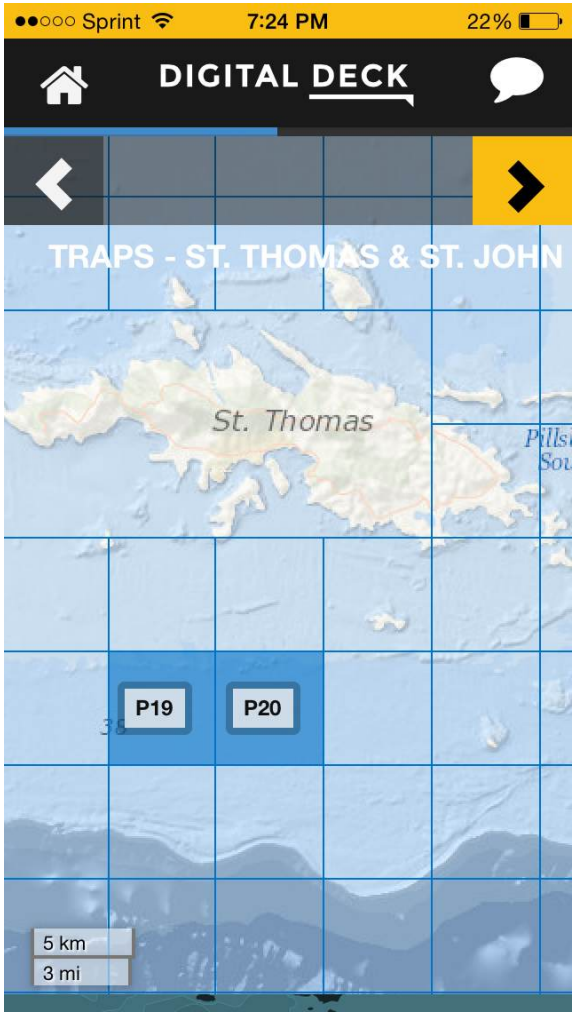
USVI







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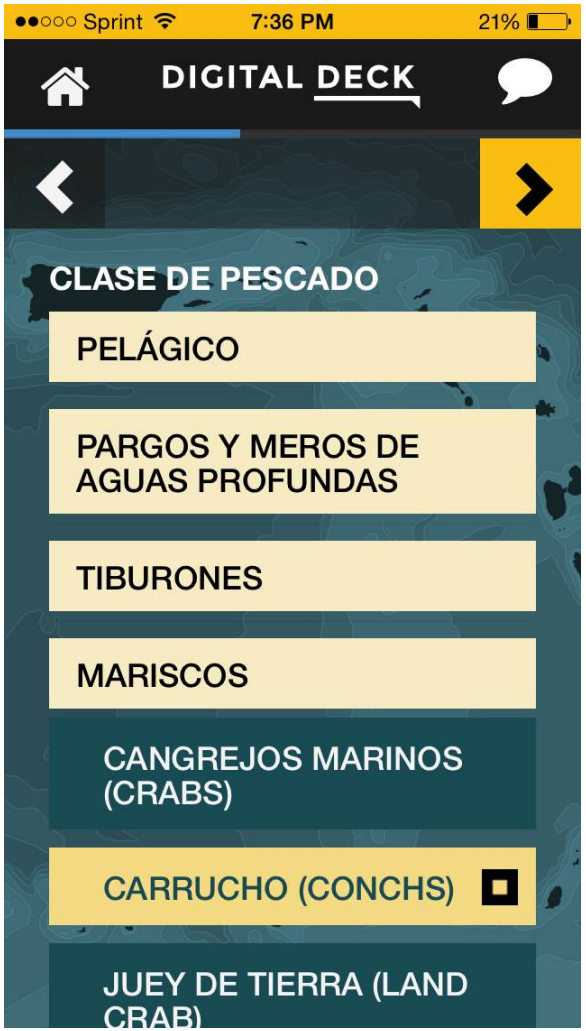
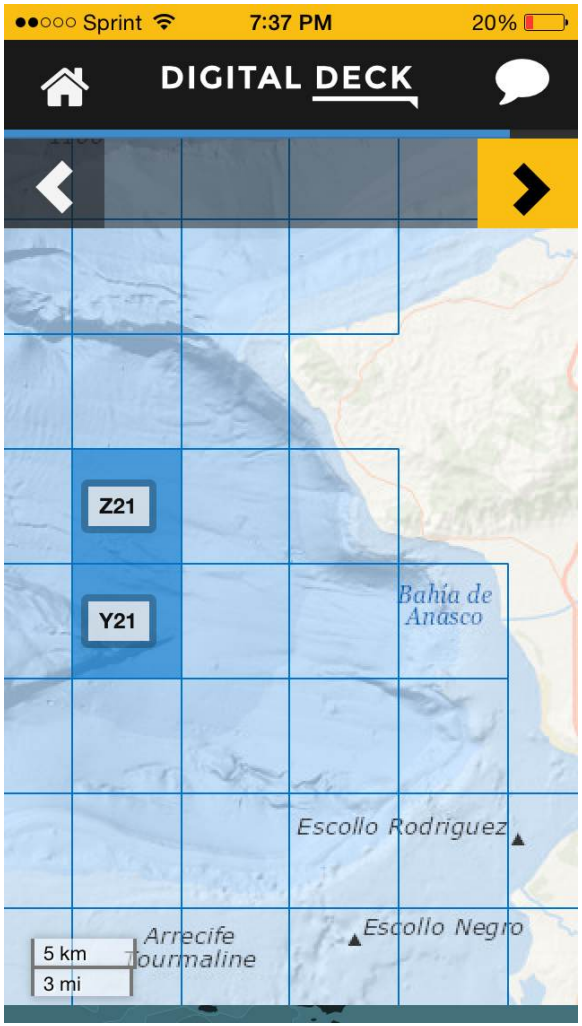
Puerto Rico





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POINT 97 Digital Deck USVI & Puerto Rico

Signed in as dan (admin) Sign Out

506
TOTAL REPORTS

506
NEED REVIEW

0
FLAGGED

OVERVIEW: ACL PROGRESS

CATCH REPORT DATA

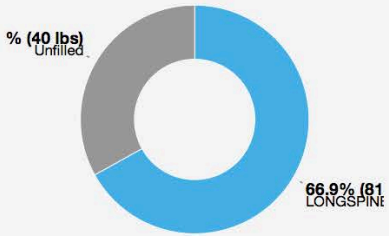
REVIEW CATCH REPORTS

ADD CATCH REPORT

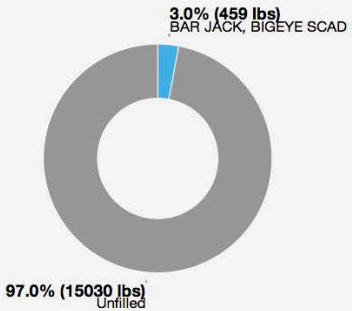
Search

Region | St. Croix | St. Thomas & St. John

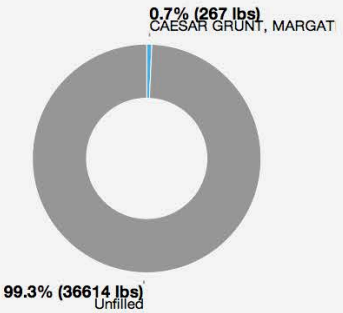
SQUIRRELFISH



JACK



GRUNT



SQUIRRELFISH	66.9%
JACK	3.0%
GRUNT	0.7%
PORGY	0.2%
BOXFISHES	0.0%

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POINT 97

POINT 97 Digital Deck USVI & Puerto Rico

Signed in as dan (admin) Sign Out

506
TOTAL REPORTS

506
NEED REVIEW

0
FLAGGED

OVERVIEW: ACL PROGRESS

CATCH REPORT DATA

REVIEW CATCH REPORTS

ADD CATCH REPORT

Search

ANGELFISHES	1,037.0 lbs
BALLYHOO	1,205.0 lbs
CONCH	2,395.0 lbs
DOLPHIN	1,297.0 lbs
EEL	20.0 lbs
FLYING FISH	33.0 lbs
GROUPER	6,413.5 lbs
GRUNT	2,313.0 lbs
JACK	2,240.0 lbs
LOBSTER	18,561.5 lbs
MACKEREL	286.0 lbs

POINT 97 Digital Deck USVI & Puerto Rico

Signed in as dan (admin) Sign Out

506
TOTAL REPORTS

506
NEED REVIEW

0
FLAGGED

OVERVIEW: ACL PROGRESS

CATCH REPORT DATA

REVIEW CATCH REPORTS

ADD CATCH REPORT

Search

Catch Report Review: Region

Region | St. Croix | St. Thomas & St. John

Nov 28, 1999 to Oct 18, 2022

All Staff

All Review States

bigeye (10/18/2022) needs review

cmartinez (03/01/2014) needs review

cmartinez (02/28/2014) needs review

demo (02/28/2014) needs review

Ernest (02/26/2014) needs review

Showing 5 of filtered from 506

← Previous Next →

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AT&T LTE
11:10 AM
DIGITAL DECK
WEIGHT (SPEAR OR BY HAND)
Whole Po...
Gutted P...
Spiny
Lobster
POINT 97

Phase 1 Status

Usage Statistics

- 27 fishers using app
- 428 reports submitted in the last 7 months
- Average of 16
- Range of 2-65

Agency Dashboard ready for field testing

NOAA database link needs to be tested

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Coca-Cola perfection
ice cold
Bass Pro Shops

Key Lessons

Co-developing app with fishers is key

Project Structure

- Long distance
- Limited resources
- Hardware issues
- Fishing schedules
- Double reporting

Incentives need to be aligned with fisher interests

Desktop app will recruit more fishers

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Recommendations

Capitalize on early investment and momentum to scale up in the region

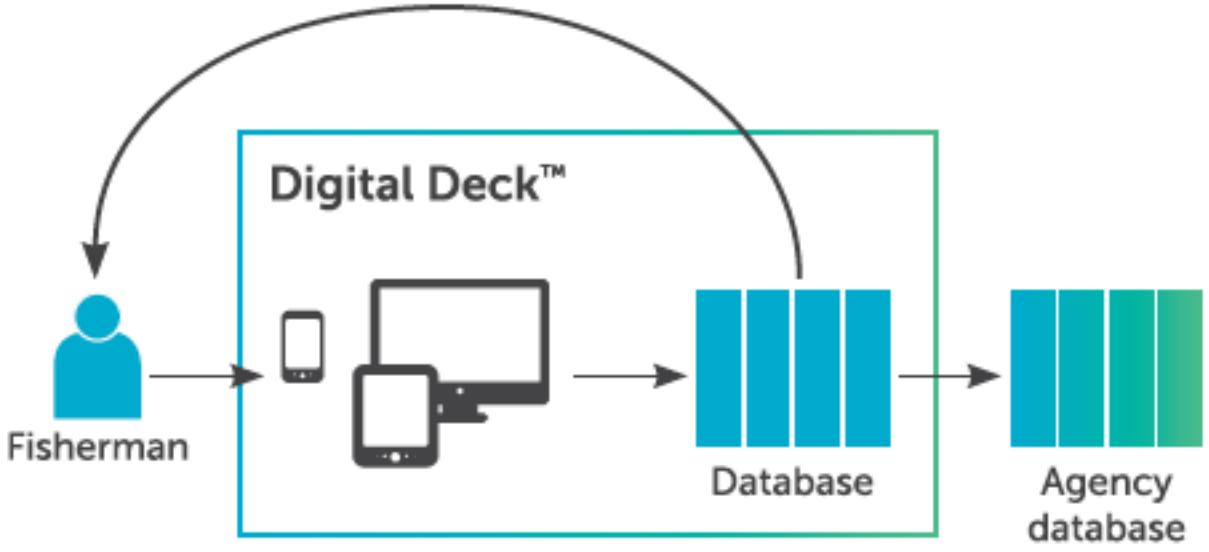
Making app scalable and adoptable to region

- Create on-island support systems
- Have fishers use their own hardware
- Apps (iOS, Android) and Desktop app
- Coordinate with agencies on report accounting

Recommendations

Codify paperless process for participants

- Ensure agency confidence in timeliness and quality of data
- Ensure NOAA data link in timeliness and quality of data



Phase 2

Expansion of use

- Attract 30 additional users
- Place mobile app in App Stores, deliver desktop app
- Hire technical and logistical support

Roadmap to implementation

- Work with partners to identify steps and timeline
- Identify policies, regulations, legal framework
- Develop data and database standards for ER

Continue Digital Deck Development

- Target updates and features for Phase 2

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Funding

Phase 2 total cost – $375,000

- Applied for NFWF CRCF $75,000 to begin work
- Expansion/On-island support $145,000
- Roadmap for implementation $120,000
- Continued development $110,000

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Thank you.

Questions?

Get In Touch

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Email charles@pointnineseven.com
pointnineseven.com

From Paper to Digital – The Mobile App Revolution

Posted by **Ruby Gates** in Ocean Views on April 14, 2014

Its 3 a.m. in the morning and Ernest Gutierrez Jr. and his brother Derek, third generation fishermen from the island of St. Thomas, are sorting their catch. With only a few hours left before morning customers arrive, they still have their catch report to fill out –a lengthy paper form required by the Division of Fish and Wildlife used for fisheries management. Once a week, Ernest and Derek carve out time to drive over to the east end of the island to deliver their stack of finished reports

Eliminating Paper-Based Reporting

This backdrop of paperwork and livelihoods underscores the ongoing competition for ocean and marine resources–including the increasing overlap of diversified demands of food and economic security- placing relentless pressure on ocean resources. Fishermen and fisheries alike recognize that real-to-near-time data is the path for finding common ground. At the heart of this transformation, however, is the ability to eliminate paper-based data collection –an often inaccurate and labor-intensive process. For the Gutierrez brothers, long-standing manual data collection and time-consuming weekly report delivery is shifting in favor of new technologies, policy changes and an enriched landscape of information management.

Ernest Quetel Jr. entering his gear type into the Digital Deck app. (Photo by Point 97)

Emerging technologies like Digital Deck create a level playing field between fisherman and resource management providers. Mobile apps driven by open source software create a platform that digitizes time consuming catch reports, seamlessly uploading valuable information on fish harvests, species patterns, ocean demographics, and behavioral information creating opportunities to link various stakeholders together and drive everything from improved ocean conservation to resource management to innovation.

With Digital Deck, data can flow seamlessly from the Guiterrez' boat after their harvest to fisheries' management databases, delivering aggregated data to the agencies for informed decision making, and providing secure proprietary data back to the brothers through their mobile devices.

Commercial fishing boats on the ramp at Frenchtown Market, St. Thomas, USVI. (Photo by Point 97)

For the first time, fishermen like the Gutierrez brothers, and their local fisheries and resource managers can control the flow of data with new technology, driving innovation, services, and conservation. Striking a balance between economic opportunity and resource management boils down to the timely use of data, a key factor missing with the collection and processing of paper catch reports

Technologies like Digital Deck are quickly becoming the foundation for equitable resource management decision-making, ensuring all stakeholders – from sea to shore- have an opportunity to leverage information and data in new, unchartered ways. In many instances, fishermen now have easy access to the same data used in determining fisheries management decisions. Their perspective and in-the-field insights contribute to the decision-making forum, providing a layer of feedback not previously leveraged in the resource management process.

Adopting best practices from industries adept at data extraction and applying them to ocean and marine resources can create a *common architecture,* helping drive data standards and integration points as the industry begins to evolve its relationship to data.

This emerging demand for smart hardware controls and continuous technological improvements demonstrates how ocean and marine resource

management can operationalize a data-driven environment for deeper, and more sustained impact.

Ruby Gates is CEO of Point 97, a marine and coastal spatial planning company using unique open platform technologies and engagement solutions that can identify competing interests on the oceans.

Keywords: conservation digital data collection fish fisheries management ocean Point 97 technology

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Comments

Antoine
France
April 15, 3:43 am

Great Article indeed on how technology can definitely be a plus for sustainable development.

On our side at Datafield, we propose mobile data collection tool
in remote area to help development agencies collect specific information about local efforts on child development and family planing. The mobile app helps get rid of paper + take pictures and know GPS position of respondents… so that's a great improvement from the past.

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