The National Academies of SCIENCES ENGINEERING MEDICINE
GULF RESEARCH PROGRAM

Healthy Ecosystems Grants 2 Final Report

Project Title: Synthesizing Spatial Dynamics of Recreational Fish and Fisheries to Inform Restoration Strategies: Red Drum in the Gulf of Mexico
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Awardee: University of Florida
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I. PROJECT SUMMARY (from proposal)

Recreational fisheries provide direct connections between Gulf biological resources and the economies, health and well-being of coastal communities. These systems can be strongly impacted across spatial and temporal scales by disturbances such as oil spills. For example, an oil spill and associated responses such as oil removal activities and fishery closures affecting one region of the Gulf may impact other regions through partial loss of recruitment to a shared stock, or through re-distribution of fishing pressure to other regions. Restoration initiatives must likewise be implemented in spatially explicit contexts (e.g. specific state shorelines, regions or habitats), but success of these programs may depend on Gulf-wide processes (e.g. healthy offshore Gulf fish stocks). Successful restoration and continued management of recreational fisheries therefore depends on a good understanding of linkages between broader processes and local dynamics in the interlinked ecological and human components of this social-ecological system. Unfortunately, even though detailed spatially explicit information is routinely

collected in fisheries monitoring programs and research projects, this information has not been collated, synthesized and made useful to the evaluation of restoration options.

The proposed project will provide a first Gulf-wide synthesis of the spatial dynamics of a recreational fisheries system: the red drum fishery which is of major economic and cultural significance throughout the region. The objectives of the project are: (1) to collate and synthesize habitat, fish population and angler behavior data from routine monitoring programs and individual research projects; (2) to develop spatial models of red drum recruitment and angling effort dynamics; (3) to develop an integrated, spatially explicit social-ecological systems model for the red drum fishery; (4) to evaluate potential restoration strategies following disturbances such as oil spills; (5) to make data and modeling tools available to other researchers in the Gulf and encourage their use in restoration measures.

The project directly addresses Goal 3 of the Gulf Research Program (Advance understanding of the Gulf of Mexico region as a dynamic system with complex, interconnecting human and environmental systems, functions, and processes to inform the protection and restoration of ecosystem services). Knowledge of the spatial scales at which red drum recruitment varies and is regulated should inform the spatial scales of restoration activities useful for supporting specific coastal communities and help determine if and how spatially explicit management regulations are enacted. Similarly, understanding the spatial dynamics of anglers pursuing red drum is necessary to predict how successful local red drum population recovery or augmentation can be expected to influence market activity, catch rates, and carry-on effects on fish populations. Integrating recruitment and angler effort spatial dynamics into a social-ecological model will for the first time allow evaluating fisheries restoration strategies in way that is both location-specific and takes account of spatial and social-ecological feedbacks. Project outputs will break new ground scientifically and be directly useful to support management, restoration and monitoring decisions. While this project focuses on red drum as a case study, the approach will serve as a template readily applicable to multiple fisheries of interest.

II. PROJECT SUMMARY (from final report)

Recreational fisheries provide direct connections between Gulf biological resources and the economies, health and well-being of coastal communities. These systems can be strongly impacted across spatial and temporal scales by disturbances such as oil spills. Successful restoration and continued management of recreational fisheries therefore depends on a good understanding of linkages between broader processes and local dynamics in the interlinked ecological and human components of this social-ecological system. Focusing on the red drum fishery, the most targeted recreational resource in the Gulf, The project addressed this problem by synthesizing habitat, fish population and angler behavior data, developing spatial models of red drum recruitment and angling effort dynamics; developing an integrated, spatially explicit social-ecological systems model for the red drum fishery; and evaluating potential restoration strategies following disturbances. Red drum settlement and recruitment were found to be correlated among sampling sites on scales of tens to hundreds of miles. While the red drum stock has a gulf-wide distribution, it shows meta-population dynamics that are driven primarily at smaller spatial scales. Anglers targeting red drum were likewise characterized by the short travel distances, leading to localized dynamics of fishing effort. Simulation evaluation of management responses to disturbances and habitat loss shows that such responses are most effective and least costly

if implemented at scales commensurate with the impact of the disturbance. Overall, project results show that the red drum fishery is best assessed and managed at multiple, nested spatial scales and that incorporation of a place-based 'layer' of fisheries governance, responsive to local conditions and stakeholders, is likely to enhance resilience.

III. PROJECT RESULTS

Accomplishments

What is the problem you were trying to address?

Recreational fisheries provide direct connections between Gulf biological resources and the economies, health and well-being of coastal communities. These systems can be strongly impacted across spatial and temporal scales by disturbances such as oil spills. For example, an oil spill and associated responses such as oil removal activities and fishery closures affecting one region of the Gulf may impact other regions through partial loss of recruitment to a shared stock, or through re-distribution of fishing pressure to other regions. Restoration initiatives must likewise be implemented in spatially explicit contexts (e.g. specific state shorelines, regions or habitats), but success of these programs may depend on Gulf-wide processes (e.g. healthy offshore Gulf fish stocks). Successful restoration and continued management of recreational fisheries therefore depends on a good understanding of linkages between broader processes and local dynamics in the interlinked ecological and human components of this social-ecological system. Unfortunately, even though detailed spatially explicit information is routinely collected in fisheries monitoring programs and research projects, this information has not been collated, synthesized and made useful to the evaluation of restoration options. The project provided a first Gulf-wide synthesis of the spatial dynamics of a recreational fisheries system: the red drum fishery.

What did you do to address this problem?

The project addressed this problem by: (1) collating and synthesize habitat, fish population and angler behavior data from routine monitoring programs and individual research projects; (2) developing spatial models of red drum recruitment and angling effort dynamics; (3) developing an integrated, spatially explicit social-ecological systems model for the red drum fishery; (4) evaluating potential restoration strategies following disturbances such as oil spills; (5) conducting auxiliary studies and analyses to inform model development and management/restoration strategies; and (6) make data and modeling tools available to other researchers in the Gulf and encourage their use in restoration measures. Habitat, fish population and angler behavior data from routine monitoring programs throughout the Gulf of Mexico region have been collated and synthesized. Following an initial workshop during which data owners (mostly state agencies and some state-funded university researchers) agreed to share their data for the purpose of the project but requested that third-party requests for raw data should be directed to them rather than fulfilled by the project, the decision was made to create synthetic data sets as needed in the project, but not to compile all raw data into a single database system.

Fisheries independent data describing red drum settlement and recruitment were available for all Gulf States with Florida, Louisiana and Texas providing the greatest spatial and temporal coverage. Data for each state have been collected independently, but all employ systematic, spatially explicit sampling at multiple research sites conducted over monthly, seasonal or annual intervals with multiple gear types

tracking multiple sizes of red drum. Samples also contain environmental covariates (e.g. structural habitat, water quality parameters). These data were aggregated and standardized via Generalized Linear Models and random forest models to generate standardized spatially explicit and relatable red drum settlement and recruitment indices.

Settlement and recruitment correlation and causation across space were examined using two different approaches: Correlation analysis and Empirical Dynamic Modeling (EDM). While correlation analysis allows to assess the spatial scale of recruitment correlation, EDM is a more advanced time series analysis method that aims to establish the dynamic 'legacy' of one site's influence onto another's.

Fisheries dependent data were used to assess spatial dynamics of anglers targeting red drum. Angler behavior (trip) data is already available in a standardized form in the NOAA MRIP database for all Gulf states except for Texas (which does not participate) and more recently Louisiana (which has withdrawn). To ensure maximum consistency, the decision was made to use MRIP data for all states including Louisiana and to analyze Texas creel survey data in a comparable fashion. In addition to recording catch information, these intercept records include information regarding the target species anglers sought, as well as the location from which they traveled (home zip code). This information was used to identify the subset of intercept data where red drum were considered the target species. For each record, average distance traveled was calculated from the zip code of the intercept (boat ramp) and the home zip code.

A fully integrated and spatially explicit quantitative model that describes age and size structured red drum populations with accounting of larval diffusion, settlement and recruitment processes, as well as multi-attribute utility-based angler effort dynamics has been developed. This model allowed us to evaluate the dynamic consequences of spatio-temporal variation in recruitment and fishing effort derived from gulf-wide data. The model was used to evaluate potential restoration strategies following disturbances such as oil spills and longer-term habitat loss.

We also synthesized and analyzed several other data sets and auxiliary projects to inform model development and management/restoration strategies. This included a meta-analysis of density-dependent mortality in the life cycle of fishes, which informed the settlement/recruitment analyses and the population model structure. Further studies concerned recreational angler's interest in, and capacity for participating in voluntary data collection and place-based fisheries management initiatives.
Data and modeling tools have been made available to other researchers in the Gulf and will continue to be made available over the coming year as project results are published in the peer reviewed literature.

<u>What were your results?</u>

Red drum settlement and recruitment dynamics
Red drum settlement (arrival of juveniles in nearshore habitats) and recruitment (survival past the subsequent stage of juvenile density-dependent mortality) were found to be correlated among sampling sites on scales of tens to hundreds of miles. On the whole, settlement was more strongly correlated among sited and over larger spatial scales than recruitment. This indicates that settlement is driven by

regional/sub-regional population processes, while recruitment processes at a smaller, estuary/bay scale. There is some regional variation in this pattern, with recruitment among Louisiana sited being more strongly correlated over a larger spatial scale than in Florida or Texas. This is likely to reflect the strong effect of the Mississippi outflow and associated environmental processes on the dynamics of red drum in the region. The overarching implication of this result is that, while the red drum stock enjoys a gulf-wide distribution, it shows meta-population dynamics that are driven primarily at smaller spatial scales.

Fishing effort and angler travel patterns

Fishing effort targeting either red drum or a combination of inshore species varied both spatially and temporally. Effort was broadly related to coastal population density but rural areas were characterized by a higher ratio of effort to population density compared to urban areas. A particularly novel socioeconomic aspect of the project is the estimation of foraging ranges exhibited by recreational anglers targeting red drum. Pooled across years and regions, anglers targeting red drum were characterized by the shortest travel distances with a 0.50 quantile distance of 31 miles. These results suggest that while some anglers travel from greater distances, it is reasonable to expect that anglers targeting this species reside relatively nearby. As might be expected, travel distances varied with the location of population centers, with average travel distances shortest in areas with coastal population centers (e.g. Tampa Bay or Sarasota Bay in Florida). Overall, these results show that the dynamics of fishing effort, not unlike those of the fish populations, are driven at relatively local scales. The results also have some further implications for management of this fishery. First and foremost, they imply that red rum anglers act in a place-based manner, probably possess local ecological and fisheries knowledge, and have a vested interest in the local fishery. These issues were explored in more detail in auxiliary studies (see below).

The travel patterns also are useful for identifying the location of stakeholder groups for management or extension activities, and for economic impact studies.

Integrated fishery system modeling and evaluation of restoration strategies

The integrated, spatially explicit social-ecological systems model showed that, due to spatial connectivity of the fish populations and the multi-attribute nature of angler utility in this fishery (e.g. anglers gain utility from catch-and-release fishing even when harvest are temporarily prohibited to speed up recovery from disturbances), the fishery is overall quite resilient. Multiple potential management strategies for recovery from short-term disturbances (e.g. oil spills) or long-term habitat loss were evaluated using the model. The effect of localized mortality events is dependent on meta-population connectivity, emphasizing the importance of understanding how disturbance interacts with different life history stages. Even when connectivity is low and therefore, local mortality effects relatively long-lasting, site-based harvest restrictions are better than more spatially extensive measures. Also, since angler utility is derived from multiple objectives of which harvest is only one, temporally restricting harvest may not be very detrimental in the short term and very beneficial in the longer term due to more rapid recovery of catch rates. Overall, while disturbances such as mortality events often cause great uproar, they may not call for drastic responses. Conversely, longer-term habitat loss is a more significant, but often invisible problem.

When is a fish recruited?

In fisheries ecology and stock assessment, recruitment signifies the transition from early stages of the life cycle which are characterized by environmentally-driven variability and density-dependence in mortality rates, to a recruited phase when natural mortality is largely stable and density-independent. Age or size at recruitment is an important structural element of age-structured fisheries models and stock assessment methods, yet the choice is often somewhat arbitrary and little guidance exists for when, biologically, a fish can be considered recruited. Such models may be mis-specified when recruitment is assumed to occur too early, i.e. when 'recruited' fish are still subject to density-dependent mortality even though the model assumes that they are not. We synthesize empirical data on density- dependence in mortality at different life stages within wild, stocked, cultured and experimentally manipulated fish populations. Results suggest the existence of a broad, approximately invariant pattern of density dependence across a wide range of fish life histories. Density-dependent mortality is most likely to occur, and potentially strongest, while fish are smaller than 10% of population asymptotic lengthy $L\infty$. Both the likelihood of encountering density-dependent mortality and its potential strength are more moderate for fish between 10 and 20% of $L\infty$, and diminish in fish larger than 20% of $L\infty$. This result provides the first empirically-based guidance for determining an appropriate size or age at recruitment.

Participant motivations in volunteer angler data programs

Volunteer angler data programs can help address difficulties in collecting recreational fisheries data. However, recruiting and retaining participants can be difficult. This study surveyed participants in the Angler Action Program, a major voluntary data program, to identify motivations and barriers to participation. Results showed that participants were most motivated by the desire to improve fisheries data, contribute to original research, and benefit scientists, as well as to improve fisheries for the enjoyment of all. Notably, results showed that anglers share motivations in common with citizen scientists in other fields, and do not seem to be motivated by dissatisfaction with fishery management or the quality of fishery science. The biggest barrier to participation for nonparticipants (identified here as those who enrolled in the program but never entered data) was lack of knowledge about the program, with fishing lessa decrease in fishing the biggest barrier to continuation in the program; the time it takes to enter data, difficulties with the software, and forgetting were also cited both by nonparticipants and by program dropouts. Outreach and feedback addressing the main motivations of participants, for example by providing data syntheses and illustrating the value of the data to science and fishery management, may offer the most effective avenues to recruiting and retaining participants.

Stakeholder participation in the management inshore recreational fisheries

Stakeholder participation in management decision making is widely believed to improve satisfaction with fisheries management, compliance with regulations and persistence of the management system. A quantitative survey was used to explore attitudes toward management and perceptions of participation opportunities in the management of Florida's marine recreational fisheries. Though most (89%) respondents agreed that public input should be included in decision-making, few agreed it is (19%) or that managers listen to public input (13%), and only 15% agreed there are opportunities for them to participate. Almost half (42%) were on average dissatisfied with management outcomes and processes.

A significant correlation was found between meaningful action and satisfaction ($r=0.58$, $p<0.001$), with those who perceived opportunities for meaningful action also more satisfied with management overall. Stakeholder groups that perceived the highest and lowest opportunities for meaningful action differed in perceived opportunities for participation and understanding of the management process. However, the strongest differences related to the perceived incorporation (or lack thereof) of stakeholder input into decision making, and the quality of science behind decision making. Overall this suggests that dissatisfaction with marine recreational fisheries management is common in the region and linked to the perception that opportunities for participation are limited and not genuine. Place-based management approaches may enhance opportunities for meaningful action.

Place-based 'Fisheries Forums' were previously (2014-2016) convened in two locations (Sarasota Bay and Charlotte Harbor in South Florida) and supported by members of the project team. The current project provided an opportunity to synthesize information on their performance and potential for expansion to other locations. Forums had been designed to provide a venue for long-term engagement of stakeholders, promote in-depth consideration of important local fisheries issues, improve links between stakeholder knowledge and science, and represent place-based perspectives to management agencies. Synthesis showed that coastal fisheries stakeholders in Florida can engage in sustained, place-based collective action when basic logistic and facilitation support is available. Deliberations encompassed a broad range of issues including habitat and environmental concerns, rather than focusing primarily on fishing regulations. Deliberations led to meaningful action towards habitat improvement and voluntary fishing/boating restrictions. However, continued outside support is necessary to sustain Forums, manage possible conflicts and bring actions to fruition.

Overall, these results suggest good potential for stakeholders to engage in place-based management and restoration activities, but also point to constraints in terms of motivation and capacity to organize and sustain such initiatives.

Implications

What are the implications of the project results for other current work or any future work of the project team (e.g., changes in focus or practices, new opportunities for funding, new collaborations)?

Project results have proved transformational to the project team's work on coastal fisheries management and restoration by scaling up and integrating work on spatial fisheries dynamics that was previously limited to southwest Florida and less integrated across ecological and human dimensions. Studying Gulf- wide patterns of fish recruitment and fisher movement in a comparative perspective also provided important new insights into regional differences in the drivers of these processes. Last but not least, the project has helped us establish Gulf-wide collaborations, in particular with state agency scientists and managers.

What are the implications of the project results for the research or practices of others?

Project results provide the most comprehensive and integrated analysis of the dynamics of a recreational fishery for a widely distributed inshore stock with meta-population structure. The realization that fish and fisher dynamics in this system occur at relatively small spatial scales (tens to

hundreds of miles) implies that assessment and management of this fishery and similar fisheries would benefit from approaches that are commensurate with the natural scale of fisheries dynamics. This would also allow for greater involvement of fishers in research and management at the scales at which they operate, possess detailed knowledge, and are vested in management.

Why are the results important to science or society?

The exact purpose of this project is to provide information necessary for making good decisions regarding the future restoration and management actions affecting the valuable red drum fishery in the Gulf of Mexico. The evaluation of different management actions is directly useful to coastal communities, regional managers, and state agencies seeking to bolster resilience of coastal communities by preserving community health and the ecosystem services on which it depends. While substantial ecological and socioeconomic information has been collected along these coastlines and from the members of these communities as part of state and federal programs, very little of this information has been synthesized to produce meaningful suggestions regarding future management. By synthesizing readily available information regarding the red drum settlement and recruitment processes, as well as angler effort processes, this project provides a basis for rigorously, systematically and quantitatively considering restoration and management actions.

Unexpected Results

An unexpected result was that the spatial scale of recruitment dynamics in the red drum fishery varies systematically around the Gulf. Recruitment varies on relatively small spatial scales in the estuaries of Florida and Texas, but shows consistent variation at a larger scale in Louisiana. This is likely attributable to the overwhelming influence of the Mississippi outflow in and around Louisiana, whereas the Florida and Texas estuaries are subject to more local environmental drivers. The bottom line is that local environmental drivers are always important, but the degree to which such drivers share common influences over a larger scale varies regionally.

Project Relevance

The following audiences would be most interested in the results of this project:

- Researchers
- Educators
- Community Leaders
- Local Government Officials
- State Government Officials
- Federal Government Officials
- Non-Profit Private Sector
- For-Profit Private Sector

Researchers: Project results transform our understanding of the dynamics and management of red drum and other widely distributed coastal fish species with metapopulation dynamics.

Educators: Same fundamental interest as researchers, but also education and outreach about the importance of local ecology and management/restoration in this widely distributed stock.

Community Leaders and Local Government Officials: Importance of local ecology and management/restoration in this widely distributed stock and other, similar fisheries.

State and Federal Government Officials: Results indicate that management or restoration of this fishery requires attention to processes and actions at multiple scales, from local to regional and Gulf-wide.

Non-Profit Private Sector: Opportunities to support fisheries restoration and place-based management.

For-Profit Private Sector: Impacts of environmental drivers and possible disturbances on fisheries dynamics and angler satisfaction and travel behavior.

Education and Training

Number of students, postdoctoral scholars, or educational components involved in the project:

- Undergraduate students: 0
- Graduate students: 1
- Postdoctoral scholars: 2
- Other educational components: 0

IV. DATA AND INFORMATION PRODUCTS

This project produced data and information products of the following types:

- Data
- Scholarly publications, reports or monographs, workshop summaries or conference proceedings
- Websites or data portals
- Models or simulations
- Software packages or digital tools, or other interactive media

DATA

See attached Data Report.

Relationships Between Data Sets:

The data sets represent different levels of synthesis and analysis of the raw, fisheries independent and dependent data sets.

Other Activities to Make Data Discoverable:

We have created a dedicated website to disseminate project results and other information on the red drum fishery: http://reddrumfishery.org/

INFORMATION PRODUCTS

See attached Information Products Report.

Citations for Project Publications, Reports and Monographs, and Workshop and Conference Proceedings:

Crandall, C.A., Monroe, M., Dutka-Gianelli, J., Fitzgerald, B. & Lorenzen, K. (2018) How to bait the hook: identifying what motivates anglers to participate in a volunteer angler data program. Fisheries (in press)

Camp, E.V., Ahrens, R.N.M., Crandall, C.A. & Lorenzen, K. (2018). Angler travel distances: implications for spatial approaches to marine recreational fisheries governance. Marine Policy 87: 263-274.

Lorenzen, K., Ainsworth, C.H., Baker, S.M., Barbieri, L.R., Camp, E.V., Dotson, J.R., Lester, S.E. (2017) Climate change impacts on Florida's fisheries and aquaculture sectors and options for adaptation. In: E.P. Chassignet, J.W. Jones, V. Misra & J. Obeysekera. (Eds.) Florida's Climate: Changes, Variations, & Impacts. pp. 427-455. Gainesville, FL: Florida Climate Institute. https://doi.org/10.17125/fci2017.ch14

Websites and Data Portals:

- http://reddrumfishery.org/

We plan to maintain and expand the project website for a minimum of five years, possibly indefinitely. Data and software will be archived successively as results are formally published in the peer-reviewed literature.

Other Activities to Ensure Access to Information Products:
We have created a dedicated website to disseminate project results and other information on the red drum fishery: http://reddrumfishery.org/

V. PUBLIC INTEREST AND COMMUNICATIONS

Most Unique or Innovative Aspect of the Project
Integrative, spatially explicit analysis of fish and fisher dynamics in a widely distributed coastal recreational fishery.

Most Exciting or Surprising Thing Learned During the Project
That the dynamics of the fish stock and fishery are driven at relatively local scales (tens to hundreds of miles) despite the very wide distribution of the stock.

Most Important Outcome or Benefit of Project
The realization that local conditions and dynamics are important is likely to pave the way for more place- based approaches to the management of coastal recreational fisheries. This is likely to provide new opportunities for stakeholder engagement and result in an overall increase in fisheries and community resilience.

Communications, Outreach, and Dissemination Activities of Project
Project results have been disseminated in multiple conference presentations:
Lorenzen, K. & Camp, E. Density dependent mortality in the life cycle of fishes: When is a recruit not a recruit? CAPAM Recruitment Workshop, Miami, FL (2017)

Lorenzen, K., Camp, E., Crandall, C., Dutka-Gianelli, J., Hazell, J., Leber, K., Staugler, E. & Struve, J. Spatial scales of stock dynamics, fisher behavior and governance arrangements in Florida's coastal sport fisheries: a case for place-based management? ICES Annual Science Conference, Ft. Lauderdale, FL (2017)

Lorenzen, K., Crandall, C., Dutka-Gianelli, J., Hazell, J., Staugler, E., Leber, K., Camp, E. & Struve, J. Fisheries Forums: Exploring potentials and limitations of place-based approaches to the management of Florida's coastal fisheries. American Fisheries Society 147th Annual Meeting, Tampa, FL (2017)

Camp, E.V., Ahrens, R., Crandall, C., & Lorenzen, K. Angler spatial ranges: Implications for stakeholder engagement and place-based marine recreational fisheries management. American Fisheries Society 147th Annual Meeting, Tampa, FL (2017).

Crandall, C., Lorenzen, K., Monroe, M., Dutka-Gianelli, J. & Hazell, J.. Meaningful action gives satisfaction: The role of stakeholder engagement in recreational fisheries. American Fisheries Society 147th Annual Meeting, Tampa, FL (2017).

Dutka-Gianelli, J., Crandall, C., Hazell, J., Staugler, E., Leber, K., Struve, J., & Lorenzen, K. Participatory mapping: Putting fisheries stakeholders on the right spot. American Fisheries Society 147th Annual Meeting, Tampa, FL (2017).

Camp E.V., R. Ahrens & K. Lorenzen. 2016. Spatial dynamics of recreational fish and fisheries to inform restoration strategies. Challenges of Natural Resource Economics and Policy. New Orleans. March 20-22, 2016.

We have created a dedicated website to disseminate project results and other information on the red drum fishery: http://reddrumfishery.org/

Project Title: Synthesizing Spatial Dynamics of Recreational Fish and Fisheries to Inform Restoration Strategies: Red Drum in the Gulf of Mexico										
Project Director: Kai Lorenzen										
Data Report										
DataType	**DigitalResourceType**	**Title**	**FileName**	**Creators**	**PointofContact**	**PublicationYear**	**RepositoryName**	**DOIorPersistentURL**	**Keywords**	**Publications**
Ecological/Biological	Tabular/Spreadsheet	Florida red drum recruits	all_FL_rec.csv	Camp	Ed Camp edvcamp@ufl.edu 352 273 3652	2019 (anticipated)			standardized data, recruitment, redfish	
Ecological/Biological	Tabular/Spreadsheet	Florida red drum young-of-year	all_FL_yoy.csv	Camp	Ed Camp edvcamp@ufl.edu 352 273 3652	2019 (anticipated)			standardized data, YOY, redfish	
Ecological/Biological	Tabular/Spreadsheet	Texas red drum recruits	all_TX_rec.csv	Camp	Ed Camp edvcamp@ufl.edu 352 273 3652	2019 (anticipated)			standardized data, recruitment, redfish	
Ecological/Biological	Tabular/Spreadsheet	Texas red drum young-of-year	all_TX_yoy.csv	Camp	Ed Camp edvcamp@ufl.edu 352 273 3652	2019 (anticipated)			standardized data, YOY, redfish	
Ecological/Biological	Tabular/Spreadsheet	Louisiana red drum recruits	all_TX_yoy.csv	Camp	Ed Camp edvcamp@ufl.edu 352 273 3652	2019 (anticipated)			standardized data, recruitment, redfish	
Economic	Tabular/Spreadsheet	Florida red drum angler trips	FL_processed_red.csv	Camp	Ed Camp edvcamp@ufl.edu 352 273 3652	2019 (anticipated)			anlger, travel, cost, distance, trip	
Economic	Tabular/Spreadsheet	Florida red drum angler travel distance	FL_traveldata_processed_red.csv	Camp	Ed Camp edvcamp@ufl.edu 352 273 3652	2019 (anticipated)			anlger, travel, cost, distance, trip	
Economic	Tabular/Spreadsheet	Alabama red drum angler trips	AL_processed_red.csv	Camp	Ed Camp edvcamp@ufl.edu 352 273 3652	2019 (anticipated)			anlger, travel, cost, distance, trip	
Economic	Tabular/Spreadsheet	Alabama red drum angler travel distance	AL_traveldata_processed_red.csv	Camp	Ed Camp edvcamp@ufl.edu 352 273 3652	2019 (anticipated)			anlger, travel, cost, distance, trip	
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Economic	Tabular/Spreadsheet	Mississippi red drum angler trips	MS_processed_red.csv	Camp	Ed Camp edvcamp@ufl.edu 352 273 3652	2019 (anticipated)			anlger, travel, cost, distance, trip	
Economic	Tabular/Spreadsheet	Mississippi red drum angler travel distance	MS_traveldata_processed_red.csv	Camp	Ed Camp edvcamp@ufl.edu 352 273 3652	2019 (anticipated)			anlger, travel, cost, distance, trip	
Economic	Tabular/Spreadsheet	Texas red drum angler trips	TX_processed_red.csv	Camp	Ed Camp edvcamp@ufl.edu 352 273 3652	2019 (anticipated)			anlger, travel, cost, distance, trip	

Economic	Tabular/Spreadsheet	Texas red drum angler travel distance	TX_traveldata_processed_red.csv	Camp	Ed Camp edvcamp@ufl.edu 352 273 3652	2019 (anticipated)			anlger, travel, cost, distance, trip	

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Project Director: Kai Lorenzen									
Information Products Report									
InfoProductType	**DigitalResourceType**	**Title**	**FileName**	**Creators**	**PublicationYear**	**Publisher**	**RepositoryName**	**DOIorPersistentURL**	**DatasetReference**
Models and Simulations	Software and Source Code	FL catch files creation	FL red drum newrec catch files creation.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\2. creating species catches
Models and Simulations	Software and Source Code	LA catch files creation	LA red drum newrec catch files creation.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\2. creating species catches
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Models and Simulations	Software and Source Code	FL APM YOY standardization	FL_apm_yoys.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\3. standardizing data\FL
Models and Simulations	Software and Source Code	FL CKM YOY standardization	FL_ckm_yoys.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\3. standardizing data\FL
Models and Simulations	Software and Source Code	FL TBM YOY standardization	FL_tbm_yoys.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\3. standardizing data\FL
Models and Simulations	Software and Source Code	FL CHM YOY standardization	FL_chm_yoys.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\3. standardizing data\FL
Models and Simulations	Software and Source Code	FL APM recruit standardization	FL_apm_rec.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\3. standardizing data\FL
Models and Simulations	Software and Source Code	FL CKM recruit standardization	FL_ckm_rec.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\3. standardizing data\FL

Models and Simulations	Software and Source Code	FL TBM recruit standardization	FL_tbm_rec.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\3. standardizing data\FL
Models and Simulations	Software and Source Code	FL CHM recruit standardization	FL_chm_rec.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\3. standardizing data\FL
Models and Simulations	Software and Source Code	LA Barataria recruit standardization	LA_bara_recs.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\3. standardizing data\LA
Models and Simulations	Software and Source Code	LA Calcasieu recruit standardization	LA_calc_recs.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\3. standardizing data\LA
Models and Simulations	Software and Source Code	LA Mississippi recruit standardization	LA_miss_recs.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\3. standardizing data\LA
Models and Simulations	Software and Source Code	LA Outer Waters recruit standardization	LA_outwa_recs.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\3. standardizing data\LA
Models and Simulations	Software and Source Code	LA Pontchatrain recruit standardization	LA_pont_recs.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\3. standardizing data\LA
Models and Simulations	Software and Source Code	LA Sabine recruit standardization	LA_sabine_recs.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\3. standardizing data\LA
Models and Simulations	Software and Source Code	LA Terrebone recruit standardization	LA_terre_recs.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\3. standardizing data\LA
Models and Simulations	Software and Source Code	LA Vermillion Teche recruit standardization	LA_vt_recs.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\3. standardizing data\LA

Models and Simulations	Software and Source Code	TX Sabine recruit standardization	TX_site1_recs.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\3. standardizing data\TX
Models and Simulations	Software and Source Code	TX Galveston recruit standardization	TX_site2_recs.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\3. standardizing data\TX
Models and Simulations	Software and Source Code	TX Matagorda recruit standardization	TX_site3_recs.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\3. standardizing data\TX
Models and Simulations	Software and Source Code	TX San Antonio recruit standardization	TX_site4_recs.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\3. standardizing data\TX
Models and Simulations	Software and Source Code	TX Aransas recruit standardization	TX_site5_recs.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\3. standardizing data\TX
Models and Simulations	Software and Source Code	TX Corpus Chrisit recruit standardization	TX_site6_recs.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\3. standardizing data\TX
Models and Simulations	Software and Source Code	TX Upper Laguna Madre recruit standardization	TX_site7_recs.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\3. standardizing data\TX
Models and Simulations	Software and Source Code	TX Lower Laguna Madre recruit standardization	TX_site8_recs.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\3. standardizing data\TX
Models and Simulations	Software and Source Code	TX East Matagorda recruit standardization	TX_site9_recs.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\3. standardizing data\TX
Models and Simulations	Software and Source Code	TX Sabine YOY standardization	TX_site1_yoys.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\3. standardizing data\TX

Models and Simulations	Software and Source Code	TX Galveston YOY standardization	TX_site2_yoys.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\3. standardizing data\TX
Models and Simulations	Software and Source Code	TX Matagorda YOY standardization	TX_site3_yoys.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\3. standardizing data\TX
Models and Simulations	Software and Source Code	TX San Antonio YOY standardization	TX_site4_yoys.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\3. standardizing data\TX
Models and Simulations	Software and Source Code	TX Aransas YOY standardization	TX_site5_yoys.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\3. standardizing data\TX
Models and Simulations	Software and Source Code	TX Corpus Chrisit YOY standardization	TX_site6_yoys.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\3. standardizing data\TX
Models and Simulations	Software and Source Code	TX Upper Laguna Madre YOY standardization	TX_site7_yoys.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\3. standardizing data\TX
Models and Simulations	Software and Source Code	TX Lower Laguna Madre YOY standardization	TX_site8_yoys.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\3. standardizing data\TX
Models and Simulations	Software and Source Code	TX East Matagorda YOY standardization	TX_site9_yoys.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\3. standardizing data\TX
Models and Simulations	Software and Source Code	FL allsites standardized recruits and YOYs plotting	FL_allsites_plotting.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\4. plotting standardized indices\FL
Models and Simulations	Image	FL allsites standardized plotting	FL_allsites_both.pdf	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\4. plotting standardized indices\FL

Models and Simulations	Software and Source Code	LA allsites standardized plotting recruits	LA_allsites_plotting.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\4. plotting standardized indices\LA
Models and Simulations	Image	LA recruits long term sites	LA_recs_longsites.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\4. plotting standardized indices\LA
Models and Simulations	Image	LA recruits short term sites	LA_recs_shortsites.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\4. plotting standardized indices\LA
Models and Simulations	Software and Source Code	TX allsites standardized plotting recruits and YOYs	TX_allsites_plotting.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\4. plotting standardized indices\TX
Models and Simulations	Image	TX Sabine standardized plotting recruits and YOYs	TX_site1_both_newrec.pdf	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\4. plotting standardized indices\TX
Models and Simulations	Image	TX Galveston standardized plotting recruits and YOYs	TX_site2_both_newrec.pdf	Camp	2020 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\4. plotting standardized indices\TX
Models and Simulations	Image	TX Matagorda standardized plotting recruits and YOYs	TX_site3_both_newrec.pdf	Camp	2021 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\4. plotting standardized indices\TX
Models and Simulations	Image	TX San Antonio standardized plotting recruits and YOYs	TX_site4_both_newrec.pdf	Camp	2022 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\4. plotting standardized indices\TX

Models and Simulations	Image	TX Aransas standardized plotting recruits and YOYs	TX_site5_both_newrec.pdf	Camp	2023 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\4. plotting standardized indices\TX
Models and Simulations	Image	TX Corpus Chrisit standardized plotting recruits and YOYs	TX_site6_both_newrec.pdf	Camp	2024 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\4. plotting standardized indices\TX
Models and Simulations	Image	TX Upper Laguna Madre standardized plotting recruits and YOYs	TX_site7_both_newrec.pdf	Camp	2025 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\4. plotting standardized indices\TX
Models and Simulations	Image	TX Lower Laguna Madre standardized plotting recruits and YOYs	TX_site8_both_newrec.pdf	Camp	2026 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\4. plotting standardized indices\TX
Models and Simulations	Image	TX East Matagorda standardized plotting recruits and YOYs	TX_site9_both_newrec.pdf	Camp	2027 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\4. plotting standardized indices\TX
Models and Simulations	Software and Source Code	FL correlation analyses	FL_corr.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\5. correlation analyses\FL
Models and Simulations	Image	FL YOY correlation	FL_corr_recs.pdf	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\5. correlation analyses\FL
Models and Simulations	Image	FL recruit correlation	FL_corr_yoys.pdf	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\5. correlation analyses\FL
Models and Simulations	Software and Source Code	LA recruits correlation analyses	LA_corr.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\5. correlation analyses\LA

Models and Simulations	Image	LA recruits correlation long-term sites	LA_corr_recs_longsites.pdf	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\5. correlation analyses\LA
Models and Simulations	Image	LA recruits correlation short-term sites	LA_corr_recs_shortsites.pdf	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\5. correlation analyses\LA
Models and Simulations	Software and Source Code	TX correlation analyses	TX_corr.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\5. correlation analyses\TX
Models and Simulations	Image	TX YOY correlation	TX_corr_recs.pdf	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\5. correlation analyses\TX
Models and Simulations	Image	TX recruitment correlation	TX_corr_yoys.pdf	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\5. correlation analyses\TX
Models and Simulations	Software and Source Code	FL allsites random forest habitat evaluation	FL_RF_allsites.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\6. random forest\FL
Models and Simulations	Image	FL allsites YOY habitat evaluation	FL_allsites_RF_yoys.pdf	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\6. random forest\FL
Models and Simulations	Image	FL allsites recruitment habitat evaluation	FL_allsites_RF_recs.pdf	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\6. random forest\FL
Models and Simulations	Image	FL allsites random forest-generated averages	FL_allsites_RF_averages	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\6. random forest\FL
Models and Simulations	Software and Source Code	TX allsites habitat evaluation	TX_RF_allsites.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\6. random forest\TX

Models and Simulations	Image	TX allsites YOY habitat evaluation	TX_allsites_RF_yoys.pdf	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\6. random forest\TX
Models and Simulations	Image	TX allsites recruitment habitat evaluation	TX_allsites_RF_recs.pdf	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\6. random forest\TX
Models and Simulations	Image	TX allsites random forest-generated averages	TX_allsites_RF_averages	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\6. random forest\TX
Models and Simulations	Software and Source Code	FL red drum angler trip dataset creation	FL_creating_red_data.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\7. angler travel distance\FL
Models and Simulations	Software and Source Code	FL red drum angler travel distance dataset creation	FL_creating_red_traveldata.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\7. angler travel distance\FL
Models and Simulations	Software and Source Code	FL red drum angler travel distance analyses	FL_travel_analyses_figures.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\7. angler travel distance\FL
Models and Simulations	Image	FL red drum travel distance by stie	FL_travel_dist_by_site.pdf	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\7. angler travel distance\FL
Models and Simulations	Image	FL red drum travel map	FL_map.pdf	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\7. angler travel distance\FL
Models and Simulations	Software and Source Code	AL red drum angler trip dataset creation	AL_creating_red_data.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\7. angler travel distance\AL
Models and Simulations	Software and Source Code	AL red drum angler travel distance dataset creation	AL_creating_red_traveldata.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\7. angler travel distance\AL

Models and Simulations	Software and Source Code	AL red drum angler travel distance analyses	AL_travel_analyses_figures.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\7. angler travel distance\AL
Models and Simulations	Image	AL red drum travel distance by stie	AL_travel_dist_by_site.pdf	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\7. angler travel distance\AL
Models and Simulations	Image	AL red drum travel map	AL_map.pdf	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\7. angler travel distance\AL
Models and Simulations	Software and Source Code	LA red drum angler trip dataset creation	LA_creating_red_data.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\7. angler travel distance\LA
Models and Simulations	Software and Source Code	LA red drum angler travel distance dataset creation	LA_creating_red_traveldata.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\7. angler travel distance\LA
Models and Simulations	Software and Source Code	LA red drum angler travel distance analyses	LA_travel_analyses_figures.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\7. angler travel distance\LA
Models and Simulations	Image	LA red drum travel distance by stie	LA_travel_dist_by_site.pdf	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\7. angler travel distance\LA
Models and Simulations	Image	LA red drum travel map	LA_map.pdf	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\7. angler travel distance\LA
Models and Simulations	Software and Source Code	MS red drum angler trip dataset creation	MS_creating_red_data.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\7. angler travel distance\MS
Models and Simulations	Software and Source Code	MS red drum angler travel distance dataset creation	MS_creating_red_traveldata.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\7. angler travel distance\MS

Models and Simulations	Software and Source Code	MS red drum angler travel distance analyses	MS_travel_analyses_figures.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\7. angler travel distance\MS
Models and Simulations	Image	MS red drum travel distance by stie	MS_travel_dist_by_site.pdf	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\7. angler travel distance\MS
Models and Simulations	Image	MS red drum travel map	MS_map.pdf	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\7. angler travel distance\MS
Models and Simulations	Software and Source Code	TX red drum angler trip dataset creation	TX_creating_red_data.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\7. angler travel distance\TX
Models and Simulations	Software and Source Code	TX red drum angler travel distance dataset creation	TX_creating_red_traveldata.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\7. angler travel distance\TX
Models and Simulations	Software and Source Code	TX red drum angler travel distance analyses	TX_travel_analyses_figures.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\7. angler travel distance\TX
Models and Simulations	Image	TX red drum travel distance by stie	TX_travel_dist_by_site.pdf	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\7. angler travel distance\TX
Models and Simulations	Image	TX red drum travel map	TX_map.pdf	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\7. angler travel distance\TX
Models and Simulations									
Models and Simulations	Software and Source Code	Red drum simulation model and evaluation	Simulation_model_eval.R	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\8. simulation model
Models and Simulations	Image	Evaluation of mgmt. actions and strategies: 1_disp_hab	bad1_disp_hab.pdf	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\8. simulation model

Models and Simulations	Image	Evaluation of mgmt. actions and strategies: 1_nodisp_hab	bad1_nodisp_hab.pdf	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\8. simulation model
Models and Simulations	Image	Evaluation of mgmt. actions and strategies: 1_disp_harv	bad1_disp_harv.pdf	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\8. simulation model
Models and Simulations	Image	Evaluation of mgmt. actions and strategies: 1_nodisp_harv	bad1_nodisp_harv.pdf	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\8. simulation model
Models and Simulations	Image	Evaluation of mgmt. actions and strategies: 2_disp_hab	bad2_disp_hab.pdf	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\8. simulation model
Models and Simulations	Image	Evaluation of mgmt. actions and strategies: 2_nodisp_hab	bad2_nodisp_hab.pdf	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\8. simulation model
Models and Simulations	Image	Evaluation of mgmt. actions and strategies: 2_disp_harv	bad2_disp_harv.pdf	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\8. simulation model
Models and Simulations	Image	Evaluation of mgmt. actions and strategies: 2_nodisp_harv	bad2_nodisp_harv.pdf	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\8. simulation model
Models and Simulations	Image	Evaluation of mgmt. actions and strategies: 3_disp_hab	bad3_disp_hab.pdf	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\8. simulation model
Models and Simulations	Image	Evaluation of mgmt. actions and strategies: 3_nodisp_hab	bad3_nodisp_hab.pdf	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\8. simulation model
Models and Simulations	Image	Evaluation of mgmt. actions and strategies: 3_disp_harv	bad3_disp_harv.pdf	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\8. simulation model

Models and Simulations	Image	Evaluation of mgmt. actions and strategies: 3_nodisp_harv	bad3_nodisp_harv.pdf	Camp	2019 (anticipated)				U:\UF postdoc\post doc projects\Red drum synthesis project\2018\Final Report\code and figs\8. simulation model