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Authors: Soniat, Thomas M., Powell, Eric N., Cooper, Nathan A., Pace, Sara M., and Solinger, Laura K.

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PREDICTING OYSTER HARVESTS AT MAXIMUM SUSTAINED YIELD: APPLICATION OF CULTCH AND STOCK BENCHMARKS TO DEPLETED PUBLIC OYSTER REEFS IN THE NORTHERN GULF OF MEXICO

THOMAS M. SONIAT,[1,2]* ERIC N. POWELL,[3] NATHAN A. COOPER,[2] SARA M. PACE[3] AND LAURA K. SOLINGER[3]

[1]*Department of Biological Sciences, University of New Orleans, 2000 Lakeshore Drive, New Orleans, LA 70148;* [2]*Gulf States Center for Environmental Informatics, University of New Orleans, 2000 Lakeshore Drive, New Orleans, LA 70148;* [3]*Gulf Coast Research Laboratory, University of Southern Mississippi, Ocean Springs, MS 39564*

ABSTRACT A sustainable fisheries model for the estimation of harvests of oysters, maintenance of cultch, and restoration of reefs has been applied across the northern Gulf of Mexico. Oyster density and size, and cultch density are provided from surveys by State agencies. The model simulates oyster growth and mortality, and cultch loss. Reef shell mass is increased when oysters die in place and diminished when oysters are removed by fishing. Harvest is estimated as sacks of live oysters that can be removed while retaining reef quality (i.e., reef cultch mass, oyster density). Application of oyster density and cultch density standards (OCS) for fishing at maximum sustained yield shows little sustainable harvest on Public Grounds in the northern Gulf of Mexico. Model heuristics focus discovery of negative and positive feedbacks to reef demise or persistence. Oyster reef dynamics are viewed as persistent processes within negative and positive feedback loops, and occasional shifts between them. A negative feedback loop is set up on poor-quality reefs. Lack of cultch and a paucity of adult oysters diminish recruitment and shell replenishment. In the absence of recruitment, natural shell loss ultimately drives the reef to extinction. A positive feedback loop is set up on reefs with adequate cultch and an abundance of oysters. There, oysters set, survive critical early stages in boxes and reef interstices, reproduce, grow to a large size, and die in place. Harvests on high-quality reefs beyond that which maintains reef cultch and spawning stock, and consequential recruitment failure cause a shift from a positive to a negative feedback loop. Likewise, restricting harvests and planting cultch on poor-quality reefs, together with successful recruitment, promotes a shift from a negative to a positive state. Results of no-net loss of cultch (NNL) and OCS simulations suggest two distinct management approaches. The NNL promotes the sustainability of reef shell and assumes that a stable shell bed promotes a stable living resource, whereas OCS explicitly promotes the sustainability of cultch and stock at *msy* (maximum-sustainable-yield). Furthermore, OCS, which incorporates optimal reef cultch and oyster density standards, provides restoration benchmarks. Achieving sustainability at *msy* will simultaneously promote habitat restoration, restoration of ecosystem services, and a sustainable oyster fishery.

KEY WORDS: *Crassostrea virginica*, maximum sustainable yield, reference points, cultch management, fishery management, eastern oyster

INTRODUCTION

The eastern oyster *Crassostrea virginica*, is responsible for creating one of the primary habitat types in the estuaries of the northern Gulf of Mexico. The animal supports a commercial fishery, maintains a hard-bottom habitat that supports a high diversity of life, and provides a variety of additional ecosystem services including shoreline protection, water filtration, and nutrient regeneration. The economic equivalent value of these ecosystem services is considerable in terms of environmental quality, and in habitat support for other commercially and recreationally important species (Peterson et al. 2003, Kasperski & Wieland 2010, Grabowski et al. 2012).

Oysters require hard substrate for settlement and recruitment; recruitment success is a strong function of the availability of clean shell (cultch) during the spawning season (Ashton-Alcox et al. 2021). Shell, however, is not a permanent resource and achieving sustainability requires the ability to harvest the resource without compromising not only the stock, but also the habitat upon which it depends (Mann & Powell 2007). Thus, management must include not only the stock (oyster abundance) but also the habitat (oyster reef) as a comprehensive whole. Achieving *msy* (maximum-sustainable-yield) requires understanding of the habitat needs under this constraint (Powell et al. 2018).

The deteriorating condition of oyster reefs worldwide and regionally is well documented (Beck et al. 2009, Beck et al. 2011, Powell 2017). The ecosystem services of oyster reefs are well documented (Coen et al. 2007, Brumbaugh & Toropova 2008, Grabowski et al. 2012) as are threats to their existence (Rothschild 1994; Beck et al. 2009, 2011; Kirby 2004, Wilberg et al. 2011); however, solutions to the problems associated with maintaining reefs as a component of a sustainable fishery are only now emerging (Powell et al. 2012; Soniat et al. 2012, 2014).

The U.S. Gulf States have undertaken a range of management and restoration measures (Gregalis et al. 2008, 2009; Soniat et al. 2012, 2014) designed to promote recovery within a region that has historically been noteworthy for its vibrant reefs and sustained commercial production, which often accounted for more than half of the U.S. oyster supply (Churchill 1920, Schlesselman 1955, MacKenzie 1996, Vanderkooy 2012). These states also invest in a range of data collection programs designed to provide information on the status of the oyster stock (Vanderkooy 2012). Despite these efforts, Gulf oyster production has declined, as has reef habitat quality, and this decline has accelerated since 2000.

*Corresponding author. E-mail: tsoniat@uno.edu
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The principal antagonist to achieving sustainable oyster production is the absence of a comprehensive integration and analysis of existing stock abundance data and the consistent use of an assessment model capable of determining stock status in terms of the living animals and the shell resource. This present situation imperils the Gulf States' ability to conserve and restore oyster reefs. In large measure, the Gulf States' response to resource decline is focused on habitat and resource restoration using the planting of cultch (e.g., oyster shell, limestone, concrete) to promote recruitment (settlement of larvae). This is a time-honored practice, with well-documented results (Abbe 1988, Bowling 1992, LDWF 2004, Ashton-Alcox et al. 2021); however, the history of restoration projects is generally one of short-term impacts without long-term gains (Mann & Powell 2007, Kennedy et al. 2011).

Circa 2000, the Atlantic portion of the northern hemisphere traversed a regime shift with well-documented impacts on both sides of the Atlantic and across a substantive latitudinal range (Nye et al. 2014). In the Gulf of Mexico, this regime shift introduced a significant rise in estuarine temperatures documented by Fodrie et al. (2010) and Montagna et al. (2011) and impacted oysters fundamentally. Before 2000, oyster populations and commercial production waxed and waned in phase with the El Niño-Southern Oscillation cycle. Post 2000, the impact of ENSO effectively ceased (Powell 2017). Beginning in 2000, oyster populations began a more or less continuous decline. Population size frequency and age structure changed. Sex ratios became increasingly male biased. Prevalence and infection intensity of Dermo disease (*Perkinsus marinus*) at year's end declined, arguably due to increasing late summer adult mortality (Powell 2017). The signal of this regime shift covered the entirety of the Gulf of Mexico.

The Gulf oyster fishery is managed by the individual states. Historically, management has focused on seasonal closures, minimum sizes, and daily catch limits. Each state has maintained a yearly survey, but without sufficient data on growth, recruitment, and mortality rates to support an estimate of surplus production. Historically, this data-limited management philosophy succeeded due to the incredible productivity of the Gulf oyster, a species capable of spawning multiple times per year and growing to market size in 9–18 mo. (Stanley & Sellers 1986). Even the influence of Dermo disease, so destructive on the east coast (Bushek et al. 2012), did not unduly limit productivity. The change in population dynamics post 2000 vitiated this time-honored management system. As a result, oyster production dropped across the Gulf of Mexico on the state-owned oyster grounds with impacts economically and ecologically sufficient to focus considerable state and federal financial resources on a range of restoration initiatives.

The primary purpose of this study is to provide to the appropriate regulatory agencies of Texas, Louisiana, Mississippi, Alabama, and Florida a comprehensive methodology and ancillary tools for the sustainable management of public oyster reefs. Along the way, model development and heuristics focused discovery of negative and positive feedbacks to reef demise or persistence, and the elucidation of a general theory of oyster reef function.

MATERIALS AND METHODS

Study Sites

Study sites include those in Texas, Louisiana, Alabama, and Florida (Fig. 1). No formal stock assessment was conducted in Mississippi. (A known depauperate stock there did not justify agency expenditure.) Texas sites are Aransas Bay (AB), San Antonio Bay (SA), Matagorda Bay (MG), and Galveston Bay (GB). Louisiana sites are Lake Calcasieu (LC), Vermilion Bay (VB), West Terrebonne (WT), East Terrebonne (ET), Hackberry Bay (HB), Barataria Bay (BB), Breton Sound (BS), Chandeleur Sound (CS), Biloxi Marsh (BM), and Mississippi Sound (MS). The Alabama site is Mobile Bay (MB), and the Florida site is Apalachicola Bay (AP).

Stock Assessments

Texas

The Texas Parks and Wildlife Department (TPWD) conducted oyster stock assessments in Aransas Bay, San Antonio

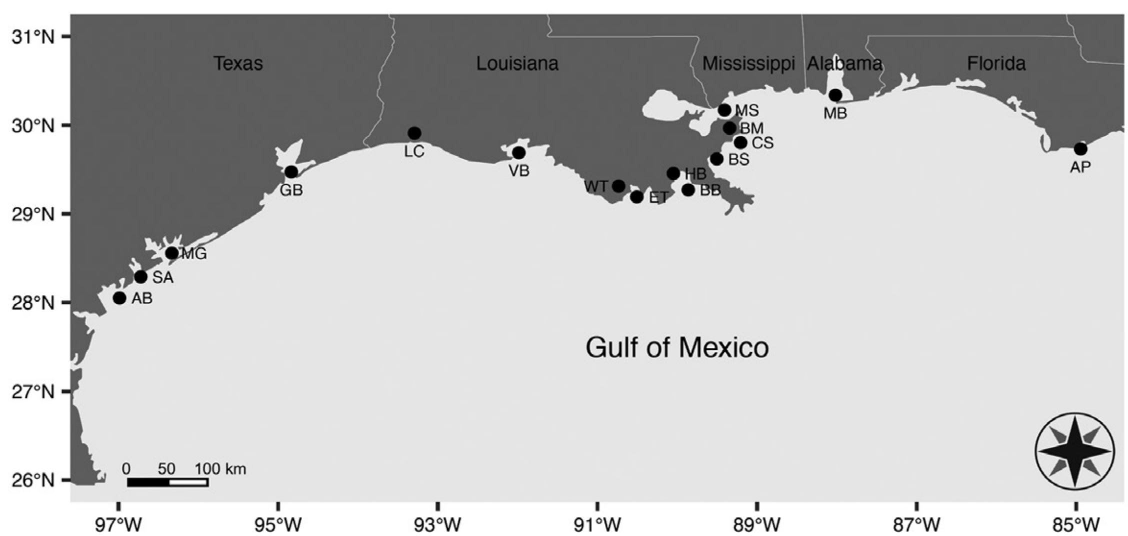

Figure 1. Location of sampled reefs in the northern Gulf of Mexico. AB, Aransas Bay; SA, San Antonio Bay; MG, Matagorda Bay; GB, Galveston Bay; LC, Lake Calcasieu; VB, Vermilion Bay; WT, West Terrebonne; ET, East Terrebonne; HB, Hackberry Bay; BB, Barataria Bay; BS, Breton Sound; CS, Chandeleur Sound; BM, Biloxi Marsh; MS, Mississippi Sound; MB, Mobile Bay; AP, Apalachicola Bay.

Bay, Matagorda Bay, and Galveston Bay. The assessments used in this study were conducted from 10/2/2020 to 10/28/2020. Bays are divided into sample grids 1 min latitude by 1 min longitude in size. Each sample grid is further divided into 144 sample gridlets that are 5 sec latitude by 5 sec longitude in size. Sampled grids and gridlets are randomly selected. Thirty samples were taken from grids/gridlets in Galveston Bay, whereas 20 samples were taken in each of Aransas, San Antonio, and Matagorda Bays.

Live oysters and shell cultch were sampled with an oyster dredge 0.5 m wide towed over a distance of 300 ft. (91.4 m). The length and weight of live oysters, whole shells, and boxes (dead oysters with articulated shells) were measured (in this study, oyster "length" is used in a fisheries context and is equivalent to standard height). Conversions to oyster density and cultch density assume a dredge efficiency of 12% (Morson et al. 2018). Details of sample grids and sampling protocol are found in TPWD (2018).

Louisiana

The Louisiana Department of Wildlife and Fisheries (LDWF) conducted stock assessments from 7/8/2020 to 7/14/2020. Divers removed oysters and surficial cultch from five replicate grid samples (1.0 m^2 or 0.25 m^2) from each station (Tables A7 and A8). Live oysters were counted and measured in 5 mm intervals. Cultch was divided into oyster shell, clam shell, limestone, and concrete, and separately weighted. Details of sampling methodology and sample locations are available as annual stock assessment reports (LDWF 2019).

Alabama

Stock assessments were conducted by the Alabama Department of Conservation and Natural Resources (ADCNR) from 5/28/2020 to 8/18/2020. Randomly selected quadrat locations were selected within known reef footprints (Table A3). Ten quadrat (1 yd^3; 0.76 m^3) samples were taken along 300 ft. transects by divers. Live oysters were counted and measured to the nearest mm. In the absence of suitable cultch data, a cultch density of 2,000 g/m^2 was assigned. Details of sample methodology are provided by ADCNR 2016.

Florida

Fifteen replicate 0.25/m^2 quadrats were sampled on seven cultch plants in Apalachicola Bay (Table A1) from 11/14/2020 to 11/15/2020. All oysters within each quadrat were collected for determination of total weight, total volume, total number of live oysters, and the total number of boxes. Shell length was measured for all oysters >25 mm; the number of oysters ≤25 mm was recorded. Surficial cultch was collected and weighed. For details of sampling methodology and sample locale, see Radabaugh et al. (2021).

Derivation of Oyster and Cultch Standards

Integrating effective surface area metrication with growth, mortality, and recruitment of eastern oysters (Hemeon et al. 2020), Solinger et al. (submitted) developed a simulation analysis to estimate characteristics of the living oyster population and dead shell bed under varying levels of fishing and Dermo (*Perkinsus marinus*) disease mortality. Simulations continued for 800 mo (approximately 70 y) during which natural mortality and fishing mortality remove live oysters (and the corresponding shell in the case of fishing mortality) from the stock, whereas boxes disarticulate and cultch degrades through taphonomic processes. At each time step, the total surface area of live oysters, boxes, and cultch (and their relative contribution to the surface area–recruitment relationship) are used to generate a number of new recruits to the population. At the termination of simulations ($t = 800$), simulated populations either collapsed as a result of fishing and Dermo mortality or sustained to the terminal month. The simulation model was verified against data for three regions of oyster beds in the Delaware Bay for which considerable survey data are available spanning the period when Dermo mortality was first observed. The simulation model representing Shell Rock was used to generate oyster and cultch density standards (see Powell et al. 2008, 2009, for information on oyster population dynamics on this bed and Hemeon et al. 2020 and Ashton-Alcox et al. 2021 for additional information on recruitment dynamics). Simulations that generated sustained populations after 800 mo spanned a range of Dermo and fishing mortalities, where fishing mortality at maximum sustainable yield (F_{MSY}) varied with the level of Dermo mortality acting on the population. A base level of Dermo mortality = 10% (a total natural mortality of 20%; Solinger et al. submitted) corresponded to an estimate of F_{MSY}, and those reference mortalities were used to derive two standards for management of oyster reefs—(1) 30 live oysters per square meter >63 mm at F_{MSY} and (2) 2,000 g/m^2 cultch at FMSY. The oyster/cultch standard (OCS) of 30/2,000 of Solinger et al. (submitted) is adopted for simulations herein.

Model Overview

Soniat et al. (2012, 2014, 2019) described a Shell Budget Model (SBM), which is a combined stock assessment and constant carbonate budget model (see Powell et al. 2018 for a review of constancy models). This model, implemented in trial phase in Louisiana (Soniat 2012, 2013, 2014, 2015, 2016), achieves simultaneously and minimally, a sustainable fishable market-size abundance and a constant surficial shell resource. The SBM simultaneously balances recruitment, natural mortality (= shell addition), and shell loss, determines the population requirements to achieve this balance, and allocates the remainder of production to the fishery.

The SBM has been successfully applied in Louisiana to estimate the sustainable catch of oysters on public oyster grounds using no-net-cultch-loss (NNL) as a primary reference point (Soniat 2012, 2013, 2014, 2015, 2016). The model simulates oyster growth and mortality, and natural cultch loss. Shell mass is increased when oysters die in place, and is diminished when oysters are removed by fishing (Soniat et al. 2012). Oyster density and size obtained from an annual stock assessment are inputs to the model. The model estimates the number of sacks of seed and sack oysters that could be removed without a net loss of cultch. The SBM includes processes of growth, natural mortality, and fishing mortality, and considers the effects of cultch density (g/m^2) and sacks of seed and sack (≥75 mm) oysters fished. The oyster population evolves in size over time, subject to natural and fishing mortality. Natural mortality provides new shell to the reef, whereas fishing removes it. Natural cultch loss occurs from taphonomic processes, mostly dissolution and biodegradation. Change in cultch density is thus a function of initial cultch density, initial population numbers, size-class distribution, shell growth, natural mortality, fishing mortality, and natural cultch loss. Expected fishing rates and times (season) are set by the user (Table 1). For model equations and details, see Soniat et al. (2012, 2014).

TABLE 1.

Fishing scenarios for various sites.

States	Site	Sack/Seed	Effort	January	February	March	April	May	June	July	August	September	October	November	December
TX	Galveston Bay	Sack	100%	4.8	0.0	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0	60.8	33.2
TX	Matagorda Bay	Sack	100%	6.9	51.5	22.6	10.2	0.0	0.0	0.0	0.0	0.0	0.0	4.6	4.2
TX	San Antonio Bay	Sack	100%	28.7	9.3	9.8	6.0	0.0	0.0	0.0	0.0	0.0	0.0	21.2	24.9
TX	Aransas Bay	Sack	100%	13.1	16.6	34.6	29.6	0.0	0.0	0.0	0.0	0.0	0.0	0.8	5.4
LA	West Terrebonne	Sack	10%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	50.0
LA	West Terrebonne	Seed	90%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0
LA	Lake Calcasieu	Sack	100%	25.0	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0	25.0
AL	Mobile Bay	Sack	100%	25.0	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.0	25.0
FL	Halfmoon	Sack	100%	0.0	0.0	0.0	0.0	0.0	50.0	50.0	0.0	0.0	0.0	0.0	0.0
FL	Lighthouse	Sack	100%	0.0	0.0	0.0	0.0	0.0	50.0	50.0	0.0	0.0	0.0	0.0	0.0
FL	Normans	Sack	100%	0.0	0.0	0.0	0.0	0.0	50.0	50.0	0.0	0.0	0.0	0.0	0.0
FL	Hotel	Sack	100%	0.0	0.0	0.0	0.0	0.0	50.0	50.0	0.0	0.0	0.0	0.0	0.0
FL	East Lumps	Sack	100%	0.0	0.0	0.0	0.0	0.0	50.0	50.0	0.0	0.0	0.0	0.0	0.0
FL	Cat Point	Sack	100%	20.0	20.0	20.0	20.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FL	Bulkhead	Sack	100%	20.0	20.0	20.0	20.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

AL, Alabama; FL, Florida; LA, Louisiana; TX, Texas. Seed fishing occurred at the West Terrebonne site only, where 90% of the total effort was expended on seed fishing and 10% effort was expended on sack fishing. The monthly distribution of effort is in percentage.

TABLE 2.

Mean monthly water temperatures from Eugene Island, central coastal Louisiana.

Month	Temperature (°C)
January	11
February	12
March	16
April	20
May	24
June	28
July	29
August	29
September	28
October	23
November	17
December	13

Data from: https://www.currentresults.com/Oceans/Temperature/louisiana-alabama-average-water-temperature.php#c.

Simulation Setup and Scenarios

Oyster density and size, obtained from stock assessments, are inputs to the model. Initial cultch density is measured (Texas, Louisiana, Florida) or assumed (Alabama). Simulations are initiated in September, use a 1-mo time step, and provide a 1y forward prediction. Oyster growth and mortality are temperature and salinity dependent. Temperature is parameterized using a lookup table of monthly mean temperatures (Table 2), whereas monthly mean salinity is parameterized using a lookup table for low, moderate, and high salinity scenarios (Table 3). Agency-chosen scenarios assign fishing season, the partition of fishing effort between months, and the distribution of effort between sack and seed fishing (Table 1).

Simulations are run for NNL and OCS reference points and the three salinity scenarios (Table 4). The status of the simulation is characterized as: solved, solved within conditions (SWC), not fishable (NF), no resource (NR), and no fishing occurred (NFO). A solved status is one in which the NNL and OCS reference points are met. An SWC status is one in which fishing conditions are met without the simulation reaching the designated

TABLE 3.

Simulations are run for low, moderate, and high salinity years.

Month	Low salinity	Moderate salinity	High salinity
January	9.8	18.3	18.8
February	9.0	15.0	21.8
March	7.3	15.3	20.5
April	6.5	13.8	22.3
May	7.3	12.8	21.8
June	9.0	12.8	17.8
July	5.5	11.3	16.3
August	7.3	11.0	18.5
September	9.0	14.0	19.3
October	11.8	16.0	23.0
November	12.3	16.3	23.8
December	11.5	16.0	25.0
Annual mean	**8.8**	**14.4**	**20.7**

Data from Melancon et al. 1998.

TABLE 4.

Summary harvest results for TX, LA, AL, and FL assuming the oyster density/cultch density standard (OCS) or the no-net-cultch loss (NNL) standard.

		TX		LA		AL		FL	
	Salinity	Sack	Seed	Sack	Seed	Sack	Seed	Sack	Seed
OCS	Low	0	N/A	0	0	0	N/A	26,732	N/A
	Moderate	0	N/A	0	0	0	N/A	5,228	N/A
	High	0	N/A	0	0	0	N/A	0	N/A
NNL	Low	1,130,391	N/A	478,229	25,203	31,343	N/A	62,070	N/A
	Moderate	941,158	N/A	458,929	6,741	230	N/A	14,690	N/A
	High	439,469	N/A	267,104	8,043	9,706	N/A	246	N/A

AL, Alabama; FL, Florida; LA, Louisiana; TX, Texas. Low, moderate, and high are the salinity scenarios (Table 3). Seed fishing occurred Louisiana only. Sack and seed harvest is in Louisiana sacks (52.85 L, 1.5 bushels).

NNL or OCS benchmark. An NF status is one in which a paucity of oysters or cultch preclude fishing, whereas NR indicates that neither cultch nor oyster resources are present. NFO indicates that no fishing occurred, either by design or because no oysters of appropriate size were available at a time when fishing was designated to occur (e.g., see Tables A1 and A7).

RESULTS

Application of the oyster density/cultch density standard (OCS) shows little sustainable harvest on Public Grounds in the northern Gulf of Mexico (Table 4). Assuming the OCS, only the Bulkhead cultch plant in Florida supported a sustainable harvest (Table A2); initial oyster density (O_A) and initial cultch density (C_A) there were 86.5 oysters/m^2 and 2863 g/m^2, respectively (Table A2). Under the low salinity scenario, 26,732 sacks are harvestable; under the moderate salinity scenario, 5,228 sacks are harvestable; no sustainable harvest is available assuming the high salinity scenario (Table 4). Seed fishing occurred only in Louisiana, where no sustainable harvest was available under the OCS assumption (Tables 4 and A8).

Harvest estimates under the no-net loss of cultch standard (NNL) are significantly greater as compared with the OCS (Table 4). Simulated Texas harvest surpasses that of the other Gulf States. In all states except Alabama, the sequence of greatest to least harvest is: low salinity scenario, moderate salinity scenario, and high salinity scenario. In Alabama, the sequence of greatest to least harvest is low, high, and moderate salinity (Table 4).

A harvest of 1,130,391 sacks at the low salinity scenario, 941,158 sacks at the moderate salinity scenario, and 439,469 sacks at the high salinity scenario are predicted (Table 4). Most of the harvest is available in Aransas and Galveston Bays (Table A5). Estimated harvest of sack-sized oysters in Louisiana is 478,229 sacks at low salinity, 458,929 sacks at moderate salinity, and 267,104 sacks at high salinity (Table 4). Virtually all of the sack harvest is from Lake Calcasieu (Table A7). Seed oyster harvest is 25,203 sacks, 6,741 sacks, and 8,043 sacks for low, moderate, and high salinity scenarios, respectively (Table 4). Seed fishing occurs only in West Terrebonne (Table 1). Alabama harvest is 31,343 sacks at low salinity, 230 sacks at moderate salinity, and 9,706 sacks at high salinity (Table 4). Cedar Point and Heron Bay supported harvests at high and low salinity scenarios, whereas at the moderate salinity scenario only Heron Bay had a harvestable resource (Table A3). Estimated harvest from Florida is 62,070 sacks at low salinity, 14,690 sacks at moderate salinity, and 246 sacks at high salinity. With the low salinity scenario, harvestable oysters were available from Bulkhead, Cat Point, Hotel, Halfmoon, and Normans. With the moderate salinity scenario, harvestable oysters were found at Bulkhead, Halfmoon, and Lighthouse. Applying the high salinity scenario, harvestable oysters were available from Bulkhead and Halfmoon (Table A1).

DISCUSSION

The Shell Budget Model (SBM) of Soniat et al. (2012, 2014, 2019) focuses on one primary reference point, cultch stability and one secondary reference point, stable market-size abundance. In each case, it calculates the stock surplus produced in a given year and assigns it to the fishery. The first evaluation is the determination of surplus shell production. As this integrates the growth and mortality of the living population, the secondary determination is the number of oysters that can be removed by the fishery within the specified shell balance. The SBM can be run in a sustainable mode or a rebuilding mode simply by specifying the desire to maintain or increment the shell resource over time; NNL simulations herein are simulations in a sustainable mode. The SBM inherently produces a stable stock and fishery, but this stability point may not be at *msy*. The OCS simulations incorporate stock and cultch reference points to achieve stability at *msy* (Solinger et al. submitted).

Model heuristics focus discovery of negative and positive feedbacks to reef demise or persistence. Oyster reef dynamics are viewed as persistent processes within negative and positive feedback loops, and occasional shifts between them (Fig. 2). A negative feedback loop is set up on poor-quality reefs. Lack of cultch and a paucity of adult oysters diminish recruitment and shell replenishment. In the absence of recruitment, natural shell loss ultimately drives the reef to extinction. Hemeon et al. (2020) argue that effective extinction occurs at some low, but nonzero, level of cultch content; that is, a point-of-no-return can feasibly be identified. A positive feedback loop is set up on reefs with adequate cultch and an abundance of oysters.

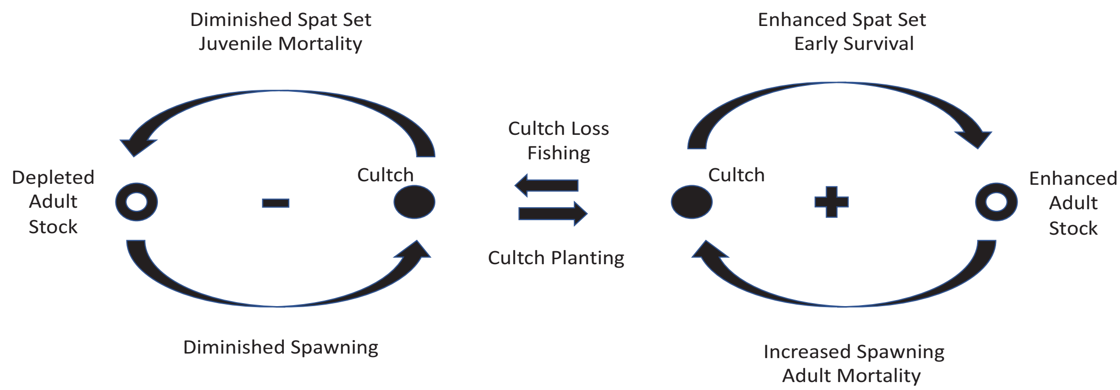

Figure 2. Positive and negative feedbacks to oyster reef enhancement or decline, and the transition between positive and negative states. Depleted cultch leads to diminished spat set and promotes juvenile mortality resulting in a depleted adult stock. A depleted adult stock decreases population spawning capacity, and a paucity of adult oysters dying in place inadequately replenishes cultch. Cultch planting can shift the reef from a negative to a positive state if spat set occurs and sufficient oysters survive to an adult size. An enhanced adult stock increases spawning capacity and large oysters dying in place replenish cultch. Natural cultch loss and cutch loss as a result of fishing potentially shifts the reef to the negative state.

There, oysters set, survive critical early stages in boxes and reef interstices, reproduce, grow to a large size, and die in place. Harvests on high-quality reefs beyond that which maintains reef cultch and spawning stock, and consequential recruitment failure cause a shift from a positive to negative feedback loop. Likewise, restricting harvests and planting cultch on poor-quality reefs, together with successful recruitment, promote a shift from a negative to a positive state. A general theory of oyster reef functionality, which identifies negative and positive feedbacks to reef decline or persistence, provides an overarching framework for effective resource management.

Results of NNL and OCS simulations suggest two distinct management approaches. The NNL promotes the sustainability of reef shell and assumes that a stable shell bed promotes a stable living resource as the former is requiring of the latter, whereas OCS explicitly promotes the sustainability of cultch and stock at *msy*. Furthermore, OCS, which incorporates optimal reef cultch and oyster density standards, provides restoration benchmarks. The simulations herein indicate that under the OCS assumption, little sustainable harvest is available on Public Grounds; in contrast, a sizeable resource is available in Texas under the NNL assumption (Table 4). By OCS standards, virtually all reefs on Public Grounds in the northern Gulf of Mexico are not self-sustaining and in need of restoration to required benchmark standards. Given the potential for rapid reef demise under conditions varying substantially from *msy* values, a precautionary approach to management would be a prudent option by invoking the NNL to encourage cultch accretion rather than stability. Achieving sustainability at *msy* will simultaneously promote habitat restoration, restoration of ecosystem services, and a sustainable oyster fishery. Importantly, the single best restoration program for the oyster is to achieve sustainability. That will impact the largest region for the longest time at, arguably, the lowest cost.

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APPENDIX

TABLE A1.

Florida 2021 no-net loss (NNL) simulation results. Salinity is the monthly salinity scenario (Table 3). Area is the simulated unit (e.g., reef, cultch plant), the size of which is given in acres. Simulation status is: solved, solved within conditions (SWC), not fishable (NF), no fishing occurred (NFO). O_A and O_B are the oyster densities (no./m^2) at the start and end of the simulation, respectively; ΔO is the percent change in oyster density; L_A and L_B are the oyster lengths at the start and end of the simulation, respectively; C_A and C_B are the cultch densities (g/m^2) at the start and end of the simulation, respectively; ΔC is the percent change in cultch density; H_{SA} is the harvest of sack oysters.

Salinity	Area	Acreage	Status	O_A	O_B	ΔO	L_A	L_B	C_A	C_B	ΔC	H_{SA}
High	Bulkhead	555.2	SWC	86.5	41.4	− ≈ 52.1	15	68.6	2,863	3,018	+ ≈ 5.4	221
	Cat Point	2,016.80	NF	17.1	7.8	− ≈ 54.5	10.8	65.6	702	691	− ≈ 1.6	0
	East Lumps	122.3	NF	7.5	3.9	− ≈ 47.3	25.9	74.4	2,413	2,247	− ≈ 6.9	0
	Halfmoon	12.2	SWC	51.5	23.8	− ≈ 53.8	13	66.5	1,472	1,550	+ ≈ 5.3	25
	Hotel	1,806.20	NF	51.7	22.6	− ≈ 56.3	8.3	63.6	2,593	2,475	− ≈ 4.6	0
	Lighthouse	310.7	NF	22.4	10.9	− ≈ 51.2	17.3	69.3	1,399	1,396	− ≈ 0.2	0
	Normans	295.1	NF	17.6	7.7	− ≈ 56.4	8	63.3	936	889	− ≈ 5	0
Moderate	Bulkhead	555.2	SWC	86.5	41.3	− ≈ 52.2	15	80.3	2,863	3,177	+ ≈ 11	5,228
	Cat Point	2,016.80	NFO	17.1	7.8	− ≈ 54.1	10.8	78.8	702	724	+ ≈ 3.1	0
	East Lumps	122.3	NF	7.5	4.2	− ≈ 44	25.9	83	2,413	2,257	− ≈ 6.5	0
	Halfmoon	12.2	SWC	51.5	20.9	− ≈ 59.4	13	79.4	1,472	1,615	+ ≈ 9.7	417
	Hotel	1,806.20	NF	51.7	22.7	− ≈ 56.2	8.3	78.2	2,593	2,562	− ≈ 1.2	0
	Lighthouse	310.7	Solved	22.4	8.2	− ≈ 63.2	17.3	80.1	1,399	1,408	+ ≈ 0.7	9,045
	Normans	295.1	NF	17.6	7.7	− ≈ 56.4	8	78.5	936	918	− ≈ 1.9	0
Low	Bulkhead	555.2	SWC	86.5	32.8	− ≈ 62.1	15	80.9	2,863	3,685	+ ≈ 28.7	26,732
	Cat Point	2,016.80	SWC	17.1	7	− ≈ 59.3	10.8	80.4	702	806	+ ≈ 14.7	4,136
	East Lumps	122.3	NF	7.5	3.2	− ≈ 57.4	25.9	82.4	2,413	2,369	− ≈ 1.9	0
	Halfmoon	12.2	SWC	51.5	16.3	− ≈ 68.3	13	81.2	1,472	1,831	+ ≈ 24.4	760
	Hotel	1,806.20	SWC	51.7	20.6	− ≈ 60.2	8.3	79.6	2,593	2,723	+ ≈ 5	16,217
	Lighthouse	310.7	SWC	22.4	5.6	− ≈ 74.9	17.3	81	1,399	1,521	+ ≈ 8.7	13,829
	Normans	295.1	SWC	17.6	7.2	− ≈ 59.3	8	79.2	936	975	+ ≈ 4.1	396

TABLE A2.

Florida 2021 oyster density/cultch density standard (OCS) simulation results. Salinity is the monthly salinity scenario (Table 3). Area is the simulated unit (e.g., reef, cultch plant), the size of which is given in acres. Simulation status is: solved, solved within conditions (SWC), not fishable (NF), no fishing occurred (NFO). O_A and O_B are the oyster densities (no./m^2) at the start and end of the simulation, respectively; ΔO is the percent change in oyster density; L_A and L_B are the oyster lengths at the start and end of the simulation, respectively; C_A and C_B are the cultch densities (g/m^2) at the start and end of the simulation, respectively; ΔC is the percent change in cultch density; H_{SA} is the harvest of sack oysters.

Salinity	Area	Acreage	Status	O_A	O_B	ΔO	L_A	L_B	C_A	C_B	ΔC	H_{SA}
High	Bulkhead	555.2	NF	86.5	41.4	− ≈ 52.1	15	68.6	2,863	3,021	+ ≈ 5.5	0
	Cat Point	2,016.80	NF	17.1	7.8	− ≈ 54.5	10.8	65.6	702	691	− ≈ 1.6	0
	East Lumps	122.3	NF	7.5	3.9	− ≈ 47.3	25.9	74.4	2,413	2,247	− ≈ 6.9	0
	Halfmoon	12.2	NF	51.5	24	− ≈ 53.4	13	66.6	1,472	1,553	+ ≈ 5.5	0
	Hotel	1,806.20	NF	51.7	22.6	− ≈ 56.3	8.3	63.6	2,593	2,475	− ≈ 4.6	0
	Lighthouse	310.7	NF	22.4	10.9	− ≈ 51.2	17.3	69.3	1,399	1,396	− ≈ 0.2	0
	Normans	295.1	NF	17.6	7.7	− ≈ 56.4	8	63.3	936	889	− ≈ 5	0
Moderate	Bulkhead	555.2	SWC	86.5	41.3	− ≈ 52.2	15	80.3	2,863	3,177	+ ≈ 11	5,228
	Cat Point	2,016.80	NF	17.1	7.8	− ≈ 54.1	10.8	78.8	702	724	+ ≈ 3.1	0
	East Lumps	122.3	NF	7.5	4.2	− ≈ 44	25.9	83	2,413	2,257	− ≈ 6.5	0
	Halfmoon	12.2	NF	51.5	24.4	− ≈ 52.6	13	80	1,472	1,642	+ ≈ 11.5	0
	Hotel	1,806.20	NF	51.7	22.7	− ≈ 56.2	8.3	78.2	2,593	2,562	− ≈ 1.2	0
	Lighthouse	310.7	NF	22.4	11.3	− ≈ 49.7	17.3	81.1	1,399	1,436	+ ≈ 2.6	0
	Normans	295.1	NF	17.6	7.7	− ≈ 56.4	8	78.5	936	918	− ≈ 1.9	0

(*Continued*)

TABLE A2. (CONTINUED)

Salinity	Area	Acreage	Status	O_A	O_B	Δ O	L_A	L_B	C_A	C_B	Δ C	H_{SA}
Low	Bulkhead	555.2	SWC	86.5	32.8	− ≈ 62.1	15	80.9	2,863	3,685	+ ≈ 28.7	26,732
	Cat Point	2,016.80	NF	17.1	7.1	− ≈ 58.2	10.8	80.3	702	814	+ ≈ 15.9	0
	East Lumps	122.3	NF	7.5	3.2	− ≈ 57.4	25.9	82.4	2,413	2,369	− ≈ 1.9	0
	Halfmoon	12.2	NF	51.5	21.7	− ≈ 57.8	13	81.5	1,472	1,986	+ ≈ 34.9	0
	Hotel	1,806.20	NF	51.7	21.4	− ≈ 58.6	8.3	79.7	2,593	2,740	+ ≈ 5.7	0
	Lighthouse	310.7	NF	22.4	9.5	− ≈ 57.7	17.3	81.5	1,399	1,645	+ ≈ 17.5	0
	Normans	295.1	NF	17.6	7.3	− ≈ 58.6	8	79.3	936	977	+ ≈ 4.3	0

TABLE A3.

Alabama 2021 no-net loss (NNL) simulation results. Salinity is the monthly salinity scenario (Table 3). Area is the simulated unit (e.g., reef, cultch plant), the size of which is given in acres. Simulation status is: solved, solved within conditions (SWC), not fishable (NF), no fishing occurred (NFO). O_A and O_B are the oyster densities (no./m^2) at the start and end of the simulation, respectively; Δ O is the percent change in oyster density; L_A and L_B are the oyster lengths at the start and end of the simulation, respectively; C_A and C_B are the cultch densities (g/m^2) at the start and end of the simulation, respectively; Δ C is the percent change in cultch density; H_{SA} is the harvest of sack oysters.

Salinity	Area	Acreage	Status	O_A	O_B	Δ O	L_A	L_B	C_A	C_B	Δ C	H_{SA}
High	Cedar Point	2,009.2	Solved	9	3.8	− ≈ 57.5	32.8	72.2	2,000	2,003	+ ≈ 0.1	6,008
	Heron Bay	143.6	SWC	9.4	2.8	− ≈ 70.2	50.1	73.4	2,000	2,074	+ ≈ 3.7	3,698
	Portersville Bay	336.4	NF	1.1	0.5	− ≈ 55.7	24.2	70.1	2,000	1,818	− ≈ 9.1	0
	Whitehouse	452.6	NF	5.3	2.5	− ≈ 52.3	34.6	75.4	2,000	1,912	− ≈ 4.4	0
Moderate	Cedar Point	2,009.20	NF	9	5.2	− ≈ 42.4	32.8	86.8	2,000	1,925	− ≈ 3.7	0
	Heron Bay	143.6	Solved	9.4	5.9	− ≈ 37.4	50.1	93.5	2,000	2,002	+ ≈ 0.1	230
	Portersville Bay	336.4	NF	1.1	0.6	− ≈ 47	24.2	83.4	2,000	1,811	− ≈ 9.4	0
	Whitehouse	452.6	NF	5.3	3.2	− ≈ 40.3	34.6	86.3	2,000	1,880	− ≈ 6	0
Low	Cedar Point	2,009.20	Solved	9	3.3	− ≈ 63.7	32.8	84	2,000	2,014	+ ≈ 0.7	25,253
	Heron Bay	143.6	Solved	9.4	2.4	− ≈ 74.7	50.1	84.9	2,000	2,012	+ ≈ 0.6	6,089
	Portersville Bay	336.4	NF	1.1	0.5	− ≈ 57.6	24.2	83.9	2,000	1,826	− ≈ 8.7	0
	Whitehouse	452.6	NF	5.3	2.3	− ≈ 56.9	34.6	84.2	2,000	1,978	− ≈ 1.1	0

TABLE A4.

Alabama 2021 oyster density/cultch density standard (OCS) simulation results. Salinity is the monthly salinity scenario (Table 3). Area is the simulated unit (e.g., reef, cultch plant), the size of which is given in acres. Simulation status is: solved, solved within conditions (SWC), not fishable (NF), no fishing occurred (NFO). O_A and O_B are the oyster densities (no./m^2) at the start and end of the simulation, respectively; Δ O is the percent change in oyster density; L_A and L_B are the oyster length at the start and end of the simulation, respectively; C_A and C_B are the cultch densities (g/m^2) at the start and end of the simulation, respectively; Δ C is the percent change in cultch density; H_{SA} is the harvest of sack oysters.

Salinity	Area	Acreage	Status	O_A	O_B	Δ O	L_A	L_B	C_A	C_B	Δ C	H_{SA}
High	Cedar Point	2,009.2	NF	9	3.9	− ≈ 56.5	32.8	72.8	2,000	2,026	+ ≈ 1.3	0
	Heron Bay	143.6	NF	9.4	3.3	− ≈ 65.1	50.1	77.6	2,000	2,303	+ ≈ 15.2	0
	Portersville Bay	336.4	NF	1.1	0.5	− ≈ 55.7	24.2	70.1	2,000	1,818	− ≈ 9.1	0
	Whitehouse	452.6	NF	5.3	2.5	− ≈ 52.3	34.6	75.4	2,000	1,912	− ≈ 4.4	0
Moderate	Cedar Point	2,009.20	NF	9	5.2	− ≈ 42.4	32.8	86.8	2,000	1,925	− ≈ 3.7	0
	Heron Bay	143.6	NF	9.4	6	− ≈ 36.3	50.1	93.7	2,000	2,005	+ ≈ 0.3	0
	Portersville Bay	336.4	NF	1.1	0.6	− ≈ 47	24.2	83.4	2,000	1,811	− ≈ 9.4	0
	Whitehouse	452.6	NF	5.3	3.2	− ≈ 40.3	34.6	86.3	2,000	1,880	− ≈ 6	0
Low	Cedar Point	2,009.20	NF	9	3.8	− ≈ 57.4	32.8	85.5	2,000	2,097	+ ≈ 4.8	0
	Heron Bay	143.6	NF	9.4	4	− ≈ 57.4	50.1	90.6	2,000	2,291	+ ≈ 14.6	0
	Portersville Bay	336.4	NF	1.1	0.5	− ≈ 57.6	24.2	83.9	2,000	1,826	− ≈ 8.7	0
	Whitehouse	452.6	NF	5.3	2.3	− ≈ 56.9	34.6	84.2	2,000	1,978	− ≈ 1.1	0

TABLE A5.

Texas no-net loss (NNL) simulation results. Salinity is the monthly salinity scenario (Table 3). Area is the simulated unit (e.g., reef, cultch plant), the size of which is given in acres. Simulation status is: solved, solved within conditions (SWC), not fishable (NF), no fishing occurred (NFO). O_A and O_B are the oyster densities (no./m^2) at the start and end of the simulation, respectively; ΔO is the percent change in oyster density; L_A and L_B are the oyster lengths at the start and end of the simulation, respectively; C_A and C_B are the cultch densities (g/m^2) at the start and end of the simulation, respectively; ΔC is the percent change in cultch density; H_{SA} is the harvest of sack oysters.

Salinity	Area	Acreage	Status	O_A	O_B	ΔO	L_A	L_B	C_A	C_B	ΔC	H_{SA}
High	Aransas Bay	6,257.1	SWC	32.7	10	− ≈ 69.2	41.9	70.8	1,105	1,989	+ ≈ 80	256,194
	Galveston Bay	20,692.5	SWC	2.4	0.6	− ≈ 75.9	50	71	419	436	+ ≈ 4.1	144,852
	Matagorda Bay	3,086.3	SWC	5.6	1.8	− ≈ 67.8	38.4	68.4	407	525	+ ≈ 28.9	20,226
	San Antonio Bay	1,135.1	SWC	6.2	1.7	− ≈ 73.6	47.8	68	969	1,053	+ ≈ 8.7	18,197
Moderate	Aransas Bay	6,257.10	SWC	32.7	10.4	− ≈ 68.1	41.9	84.5	1,105	1,363	+ ≈ 23.4	812,010
	Galveston Bay	20,692.50	Solved	2.4	1.3	− ≈ 43.7	50	93.5	419	422	+ ≈ 0.7	51,348
	Matagorda Bay	3,086.30	SWC	5.6	1.8	− ≈ 67.1	38.4	84.4	407	424	+ ≈ 4	63,770
	San Antonio Bay	1,135.10	Solved	6.2	3.1	− ≈ 50.6	47.8	93	969	971	+ ≈ 0.2	14,030
Low	Aransas Bay	6,257.1	SWC	32.7	8.7	− ≈ 73.2	41.9	83.8	1,105	1,607	+ ≈ 45.4	808,597
	Galveston Bay	20,692.5	Solved	2.4	0.6	− ≈ 76	50	85.6	419	422	+ ≈ 0.7	225,290
	Matagorda Bay	3,086.3	SWC	5.6	1.6	− ≈ 71.2	38.4	83.8	407	460	+ ≈ 12.8	62,835
	San Antonio Bay	1,135.1	Solved	6.2	1.6	− ≈ 74.7	47.8	84.7	969	970	+ ≈ 0.1	33,669

TABLE A6.

Texas oyster density/cultch density standard (OCS) simulation results. Salinity is the monthly salinity scenario (Table 3). Area is the simulated unit (e.g., reef, cultch plant), the size of which is given in acres. Simulation status is: solved, solved within conditions (SWC), not fishable (NF), no fishing occurred (NFO). O_A and O_B are the oyster densities (no./m^2) at the start and end of the simulation, respectively; ΔO is the percent change in oyster density; L_A and L_B are the oyster lengths at the start and end of the simulation, respectively; C_A and C_B are the cultch densities (g/m^2) at the start and end of the simulation, respectively; ΔC is the percent change in cultch density; H_{SA} is the harvest of sack oysters.

Salinity	Area	Acreage	Status	O_A	O_B	ΔO	L_A	L_B	C_A	C_B	ΔC	H_{SA}
High	Aransas Bay	6,257.1	NF	32.7	11.8	− ≈ 63.9	41.9	74.3	1,105	2,269	+ ≈ 105.4	0
	Galveston Bay	20,692.5	NF	2.4	0.7	− ≈ 68.9	50	76.5	419	500	+ ≈ 19.4	0
	Matagorda Bay	3,086.3	NF	5.6	2.1	− ≈ 63.2	38.4	71.9	407	570	+ ≈ 40	0
	San Antonio Bay	1,135.1	NF	6.2	2	− ≈ 67.8	47.8	73.8	969	1,193	+ ≈ 23.2	0
Moderate	Aransas Bay	6,257.1	NF	32.7	19.8	− ≈ 39.3	41.9	91.8	1,105	1,591	+ ≈ 44	0
	Galveston Bay	20,692.5	NF	2.4	1.5	− ≈ 36.2	50	94.3	419	428	+ ≈ 2.3	0
	Matagorda Bay	3,086.3	NF	5.6	3.3	− ≈ 41.1	38.4	91.7	407	460	+ ≈ 12.9	0
	San Antonio Bay	1,135.1	NF	6.2	3.9	− ≈ 37.5	47.8	95.2	969	997	+ ≈ 2.9	0
Low	Aransas Bay	6,257.1	NF	32.7	14.2	− ≈ 56.6	41.9	89	1,105	2,381	+ ≈ 115.5	0
	Galveston Bay	20,692.5	NF	2.4	1	− ≈ 56.9	50	91.1	419	498	+ ≈ 19	0
	Matagorda Bay	3,086.3	NF	5.6	2.4	− ≈ 56.3	38.4	88.7	407	582	+ ≈ 42.9	0
	San Antonio Bay	1,135.1	NF	6.2	2.7	− ≈ 56.2	47.8	91.1	969	1,169	+ ≈ 20.6	0

TABLE A7.

Louisiana no-net loss (NNL) simulation results. Salinity is the monthly salinity scenario (Table 3). Bay is the location (Fig. 1) of the reef, shell plant (SP), or cultch plant (CP). Area is the simulated unit, the size of which is given in acres. Simulation status is: solved, solved within conditions (SWC), not fishable (NF), no fishing occurred (NFO). O_A and O_B are the oyster densities (no./m^2) at the start and end of the simulation, respectively; Δ O is the percent change in oyster density; L_A and L_B are the oyster length at the start and end of the simulation, respectively; C_A and C_B are the cultch densities (g/m$_2$) at the start and end of the simulation, respectively; Δ C is the percent change in cultch density; H_{SA} is the harvest of sack oysters; H_{SE} is the harvest of seed oysters.

Salinity	Bay	Area	Acreage	Status	O_A	O_B	Δ O	L_A	L_B	C_A	C_B	Δ C	H_{SA}	H_{SE}
High	BM	3-Mile	1,020	NF	2.7	1.5	− ≈ 45.3	24.5	75.7	467	436	− ≈ 6.5	0	0
	BM	Drum Bay	1,596	NF	8	3.7	− ≈ 54	22	69.9	2,803	2,636	− ≈ 6	0	0
	BM	E. Karako	1,020	NF	5.3	2.8	− ≈ 46.7	21.1	72.7	2,004	1,835	− ≈ 8.4	0	0
	BM	Martin	1,592	NF	0	0	± 0	N/A	N/A	197	176	− ≈ 10.3	0	0
	BM	Morgan Harbor	2,954	NR	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BM	Shell Point	47	NFO	139.7	74.5	− ≈ 46.7	22.4	73.1	6,097	6,908	+ ≈ 13.3	0	0
	BM	W. Karako	1,020	NF	0.3	0.2	− ≈ 46.5	22	72.2	53	50	− ≈ 6.5	0	0
	MS	Cabbage Reef	1,804	NF	3	1.5	− ≈ 49.9	17.6	69.6	3,775	3,412	− ≈ 9.6	0	0
	MS	Grand Banks	1,066	NR	0	0	± 0	N/A	N/A	4,014	3,613	− ≈ 10	0	0
	MS	Grassy	1,066	NR	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	MS	Halfmoon	1,066	NR	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	MS	Johnson Bayou	200	NF	0	0	± 0	N/A	N/A	1	0	− ≈ 30	0	0
	MS	Millennium Reef	1,066	NF	0.3	0.2	− ≈ 40	32	82.2	2,727	2,427	− ≈ 11	0	0
	MS	Petit	1,066	NF	2.7	1.3	− ≈ 50	17.6	70.7	2,175	1,668	− ≈ 23.3	0	0
	MS	Round Island 2011 CP	291	NF	0.3	0.2	− ≈ 44.4	52	80.7	3,543	3,348	− ≈ 5.5	0	0
	MS	Turkey Bayou	1,804	NFO	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	MS	Grand Pass	1,804	NF	2	1.1	− ≈ 43.1	25.3	76.3	3,592	3,248	− ≈ 9.6	0	0
	BS	Lonesome 2009 CP	243	NFO	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	Battledore Reef	271	NF	0.3	0.2	− ≈ 52.3	57	80.9	287	268	− ≈ 6.4	0	0
	BS	Bay Long	923	NFO	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	Bayou Lost	275	NF	0	0	± 0	N/A	N/A	637	572	− ≈ 10.2	0	0
	BS	Black Bay	716	NF	0	0	± 0	N/A	N/A	10	9	− ≈ 10	0	0
	BS	California Bay	923	NR	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	Curfew	715	NR	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	E. Bay Crabe	511	NR	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	E. Bay Gardene	632	NR	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	E. Pelican	1,445	NR	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	E. Stone	829	NF	0.3	0	− ≈ 87.6	72	94	1,100	1,017	− ≈ 7.5	0	0
	BS	Elephant Pass	202	NF	0	0	± 0	N/A	N/A	70	63	− ≈ 10	0	0
	BS	Horseshoe Reef	829	NF	5.7	2.3	− ≈ 59.3	3.2	61.3	167	162	− ≈ 3	0	0
	BS	Jessie	275	NFO	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	Mangrove Point	1,445	NFO	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	N. Black Bay	829	NFO	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	N. Lake Fortuna	1,727	NFO	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	S. Black Bay	715	NF	0	0	± 0	N/A	N/A	357	321	− ≈ 10	0	0
	BS	S. Lake Fortuna	1,727	NFO	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	Snake	716	NFO	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	Stone	715	NF	0	0	± 0	N/A	N/A	163	147	− ≈ 10	0	0
	BS	Sunrise Point	923	NFO	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	Telegraph	715	NFO	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	W. Bay Crabe	511	NFO	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	Wreck	4,486	NF	0	0	± 0	N/A	N/A	10	9	− ≈ 10	0	0
	BB	BB 2004 CP	40	NF	0	0	± 0	N/A	N/A	7,320	7,239	− ≈ 1.1	0	0
	HB	HB 2004 North SP	10	NFO	4	1.5	− ≈ 63	55.3	80.4	1,963	2,172	+ ≈ 10.6	0	0
	HB	HB 2004 South SP	25	NFO	5.3	2.2	− ≈ 59.7	46.7	77.3	1,375	1,568	+ ≈ 14	0	0
	HB	HB 2008 CP	50	NFO	18	8.9	− ≈ 50.7	24.5	72.1	3,373	3,463	+ ≈ 2.7	0	0
	HB	HB 2012 CP	200	NFO	15.7	7.7	− ≈ 51.1	26	72.8	1,727	1,836	+ ≈ 6.4	0	0
	HB	HB 2014 CP	30	NFO	5.7	2.1	− ≈ 63.3	57	81.9	710	1,025	+ ≈ 44.4	0	0
	HB	Lower Hackberry	5	NR	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	HB	Middle Hackberry	5	NFO	3.3	1.5	− ≈ 56.5	48	80.9	502	611	+ ≈ 21.7	0	0
	HB	Upper Hackberry	5	NF	0.7	0.4	− ≈ 42.6	44.5	80.4	1,478	1,156	− ≈ 21.8	0	0

(*Continued*)

TABLE A7. (CONTINUED)

Salinity	Bay	Area	Acreage	Status	O_A	O_B	Δ *O*	L_A	L_B	C_A	C_B	Δ *C*	H_{SA}	H_{SE}
	ET	Lake Chien 2004 CP	16	NF	1	0.5	− ≈ 48.7	18	69.1	3,332	3,270	− ≈ 1.9	0	0
	ET	Lake Chien 2009 CP	22	NF	0	0	± 0	N/A	N/A	28	27	− ≈ 3.6	0	0
	ET	Lake Felicity	40	NF	0	0	± 0	N/A	N/A	19	18	− ≈ 3.4	0	0
	WT	SL 2009 CP	156	Solved	20.4	10.7	− ≈ 47.7	31.4	77.9	2,683	2,686	+ ≈ 0.1	8	1,730
	WT	Buckskin Bayou Junop	17	NF	3.4	1.7	− ≈ 49	19.1	70.6	752	689	− ≈ 8.5	0	0
	WT	Grand Pass	107	Solved	18.2	8.4	− ≈ 53.6	26.3	74.9	714	716	+ ≈ 0.4	7	846
	WT	Junop Bayou DeWest	34	NF	3.4	1.6	− ≈ 53.2	11.7	65.2	808	738	− ≈ 8.6	0	0
	WT	Lake Mechant	30	NF	0	0	± 0	N/A	N/A	2,682	2,638	− ≈ 1.6	0	0
	WT	Mid SL 1994 SP	552	NR	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	WT	Mid Bay Junop	73	Solved	5.8	1.5	− ≈ 73.3	48.6	78.8	495	498	+ ≈ 0.6	46	1,424
	WT	Mid Sister Lake	56	NR	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	WT	SL North 1994 SP	191	NF	0.2	0.1	− ≈ 42.6	42	77.9	48	46	− ≈ 3	0	0
	WT	SL North 1995 SP	107	Solved	13.6	5.3	− ≈ 61.3	38.1	77.3	1,281	1,285	+ ≈ 0.4	65	2,513
	WT	Old Camp	140	NF	0.2	0.1	− ≈ 56	7	62.2	134	121	− ≈ 9.6	0	0
	WT	Rat Bayou	34	NF	53.2	24.2	− ≈ 54.5	10.9	64.8	2,822	2,804	− ≈ 0.7	0	0
	WT	SL South 94 SP	513	NR	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	WT	SL 2004 CP	82	NR	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	WT	SL 2012 CP 2	365	Solved	23.2	12.1	− ≈ 47.7	24.2	74	4,146	4,174	+ ≈ 0.7	2	1,413
	WT	Walkers Point	107	Solved	11.4	5.8	− ≈ 49.5	22.4	73.2	593	595	+ ≈ 0.3	0	117
	VB	Bayou Blanc	15	NF	0	0	± 0	N/A	N/A	1,148	969	− ≈ 15.6	0	0
	VB	Big Charles	15	NF	0.4	0.2	− ≈ 44.6	34.5	77.7	2,944	2,632	− ≈ 10.6	0	0
	VB	Dry Reef	10	NF	0	0	± 0	N/A	N/A	375	331	− ≈ 11.8	0	0
	VB	Highspot	250	NF	0.4	0.2	− ≈ 46	19.5	71.3	706	637	− ≈ 9.7	0	0
	VB	Indian Point	100	NF	0.2	0.1	− ≈ 42.5	37	80.5	2,476	2,231	− ≈ 9.9	0	0
	VB	Lighthouse Point	30	NF	2.2	1.2	− ≈ 43.7	40.2	79.7	3,700	3,292	− ≈ 11	0	0
	VB	Middle Reef	20	NF	1	0.5	− ≈ 48.2	18	70.1	611	554	− ≈ 9.2	0	0
	VB	N. Reef	10	NF	0	0	± 0	N/A	N/A	1,085	923	− ≈ 15	0	0
	VB	Nickle Reef	100	NF	5.6	3.1	− ≈ 44.5	25.9	75.5	1,918	1,767	− ≈ 7.9	0	0
	VB	Rabbit	15	NF	0	0	± 0	N/A	N/A	1,174	997	− ≈ 15	0	0
	VB	Sally Shoals	5	NF	0	0	± 0	N/A	N/A	1,620	1,146	− ≈ 29.3	0	0
	LC	LC 2009 CP	295	SWC	3.6	0.2	− ≈ 94.2	90.3	79.2	4,550	4,749	+ ≈ 4.4	8,535	0
	LC	Big Washout	295	NF	0.6	0.2	− ≈ 73.4	68.7	85.3	1,802	1,659	− ≈ 7.9	0	0
	LC	Chenier Reef	10	SWC	18.4	8.2	− ≈ 55.7	42.5	76.9	9,170	9,297	+ ≈ 1.4	198	0
	LC	Lambert's 2015 CP	20	NF	1.2	0.2	− ≈ 81.7	88.7	98.3	7,530	6,953	− ≈ 7.7	0	0
	LC	Lamberts Reef	240	Solved	0.8	0	− ≈ 98.8	113.2	128.7	562	566	+ ≈ 0.7	1,827	0
	LC	Little Washout	295	SWC	4.2	0.5	− ≈ 89.1	80.8	82.3	1,458	1,555	+ ≈ 6.7	8,103	0
	LC	Mid Lake	295	SWC	1.2	0	−100	132.8	N/A	974	1,088	+ ≈ 11.7	7,324	0
	LC	N.E. Rabbit	366	SWC	2.2	0.3	− ≈ 85.7	72.9	72.7	382	423	+ ≈ 10.6	4,780	0
	LC	NW Rabbit Is.	755	SWC	9.4	1	− ≈ 88.8	84.7	78.1	172	843	+ ≈ 390.3	58,642	0
	LC	S.E. Rabbit	366	SWC	4.6	0.4	− ≈ 91	92.2	76.4	548	866	+ ≈ 58.1	15,140	0
	LC	West Cove Transplant	366	SWC	0.6	0	−100	103.7	N/A	326	350	+ ≈ 7.2	2,357	0
	LC	W. Rabbit	755	SWC	20.8	1.8	− ≈ 91.3	85.8	79.7	508	1,876	+ ≈ 269.2	121,276	0
	LC	West Cove 2015 CP	25	SWC	15.2	4.3	− ≈ 71.6	64.2	79.7	3,582	3,745	+ ≈ 4.6	1,318	0
	LC	West Cove Central	755	SWC	7	0.2	− ≈ 96.9	86.7	78.8	198	606	+ ≈ 205.8	37,476	0
Moderate	BM	3-Mile	1,020	NF	2.7	1.5	− ≈ 43	24.5	80.6	467	443	− ≈ 5.1	0	0
	BM	Drum Bay	1,596	NF	8	4.2	− ≈ 47.7	22	83.4	2,803	2,599	− ≈ 7.3	0	0
	BM	E. Karako	1,020	NF	5.3	2.9	− ≈ 45.4	21.1	81.7	2,004	1,854	− ≈ 7.5	0	0
	BM	Martin	1,592	NF	0	0	± 0	N/A	N/A	197	176	− ≈ 10.3	0	0
	BM	Morgan Harbor	2,954	NR	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BM	Shell Point	47	NFO	139.7	76.8	− ≈ 45	22.4	82.4	6,097	7,351	+ ≈ 20.6	0	0
	BM	W. Karako	1,020	NF	0.3	0.2	− ≈ 45.4	22	85.3	53	51	− ≈ 3.9	0	0
	MS	Cabbage Reef	1,804	NF	3	1.5	− ≈ 49	17.6	81.2	3,775	3,421	− ≈ 9.4	0	0
	MS	Grand Banks	1,066	NR	0	0	± 0	N/A	N/A	4,014	3,613	− ≈ 10	0	0
	MS	Grassy	1,804	NF	2	1.2	− ≈ 41.1	25.3	82	3,592	3,255	− ≈ 9.4	0	0
	MS	Halfmoon	1,066	NR	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	MS	Johnson Bayou	1,066	NR	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	MS	Millennium Reef	200	NF	0	0	± 0	N/A	N/A	1	0	− ≈ 30	0	0
	MS	Petit	1,066	NF	0.3	0.2	− ≈ 36.6	32	79	2,727	2,428	− ≈ 11	0	0
	MS	Round Island 2011 CP	1,066	NF	2.7	1.4	− ≈ 48.9	17.6	80.5	2,175	1,675	− ≈ 23	0	0

(*Continued*)

TABLE A7. (CONTINUED)

Salinity	Bay	Area	Acreage	Status	O_A	O_B	Δ O	L_A	L_B	C_A	C_B	Δ C	H_{SA}	H_{SE}
	MS	Turkey Bayou	291	NF	0.3	0.2	− ≈ 34.2	52	84.6	3,543	3,347	− ≈ 5.6	0	0
	MS	Grand Pass	1,804	NFO	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	BS 2009 Lonesome CP	243	NFO	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	Battledore Reef	271	NF	0.3	0.2	− ≈ 31.4	57	89.5	287	265	− ≈ 7.7	0	0
	BS	Bay Long	923	NFO	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	Bayou Lost	275	NF	0	0	± 0	N/A	N/A	637	572	− ≈ 10.2	0	0
	BS	Black Bay	716	NF	0	0	± 0	N/A	N/A	10	9	− ≈ 10	0	0
	BS	California Bay	923	NR	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	Curfew	715	NR	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	E. Bay Crabe	511	NR	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	E. Bay Gardene	632	NR	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	E. Pelican	1,445	NR	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	E. Stone	829	NF	0.3	0.2	− ≈ 26.2	72	97.7	1,100	1,000	− ≈ 9.1	0	0
	BS	Elephant Pass	202	NF	0	0	± 0	N/A	N/A	70	63	− ≈ 10	0	0
	BS	Horseshoe Reef	829	NF	5.7	2.3	− ≈ 59.3	3.2	72.3	167	166	− ≈ 0.3	0	0
	BS	Jessie	275	NFO	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	Mangrove Point	1,445	NFO	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	N. Black Bay	829	NFO	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	N. Lake Fortuna	1,727	NFO	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	S. Black Bay	715	NF	0	0	± 0	N/A	N/A	357	321	− ≈ 10	0	0
	BS	S. Lake Fortuna	1,727	NFO	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	Snake	716	NFO	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	Stone	715	NF	0	0	± 0	N/A	N/A	163	147	− ≈ 10	0	0
	BS	Sunrise Point	923	NFO	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	Telegraph	715	NFO	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	W. Bay Crabe	511	NFO	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	Wreck	4,486	NF	0	0	± 0	N/A	N/A	10	9	− ≈ 10	0	0
	BB	BB 2004 CP	40	NF	0	0	± 0	N/A	N/A	7,320	7,239	− ≈ 1.1	0	0
	HB	HB 2004 North SP	10	NFO	4	2.7	− ≈ 33.2	55.3	94	1,963	2,040	+ ≈ 3.9	0	0
	HB	HB 2004 South SP	25	NFO	5.3	3.4	− ≈ 36.5	46.7	91	1,375	1,450	+ ≈ 5.5	0	0
	HB	HB 2008 CP	50	NFO	18	9.8	− ≈ 45.4	24.5	82.8	3,373	3,445	+ ≈ 2.1	0	0
	HB	HB 2012 CP	200	NFO	15.7	8.7	− ≈ 44.3	26	83.6	1,727	1,804	+ ≈ 4.5	0	0
	HB	HB 2014 CP	30	NFO	5.7	3.9	− ≈ 30.9	57	94.1	710	831	+ ≈ 17	0	0
	HB	Lower Hackberry	5	NR	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	HB	Middle Hackberry	5	NFO	3.3	2.2	− ≈ 35.1	48	90.5	502	521	+ ≈ 3.7	0	0
	HB	Upper Hackberry	5	NF	0.7	0.4	− ≈ 35	44.5	83.1	1,478	1,155	− ≈ 21.9	0	0
	ET	Lake Chien 2004 CP	16	NF	1	0.5	− ≈ 48.1	18	84.5	3,332	3,274	− ≈ 1.7	0	0
	ET	Lake Chien 2009 CP	22	NF	0	0	± 0	N/A	N/A	28	27	− ≈ 3.6	0	0
	ET	Lake Felicity	40	NF	0	0	± 0	N/A	N/A	19	18	− ≈ 3.4	0	0
	WT	SL 2009 CP	156	Solved	20.4	11.8	− ≈ 42.3	31.4	83.4	2,683	2,686	+ ≈ 0.1	19	1,833
	WT	Buckskin Bayou Junop	17	NF	3.4	1.8	− ≈ 47.9	19.1	81.8	752	699	− ≈ 7.1	0	0
	WT	Grand Pass	107	Solved	18.2	9.2	− ≈ 49.7	26.3	82.7	714	716	+ ≈ 0.4	23	935
	WT	Junop Bayou DeWest	34	NF	3.4	1.6	− ≈ 52.9	11.7	80.2	808	746	− ≈ 7.7	0	0
	WT	Lake Mechant	30	NF	0	0	± 0	N/A	N/A	2,682	2,638	− ≈ 1.6	0	0
	WT	Mid SL 1994 SP	552	NR	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	WT	Mid Bay Junop	73	Solved	5.8	3.2	− ≈ 45.7	48.6	94	495	496	+ ≈ 0.2	58	634
	WT	Mid Sister Lake	56	NR	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	WT	SL North 1994 SP	191	NF	0.2	0.1	− ≈ 35	42	80.6	48	46	− ≈ 3.8	0	0
	WT	SL North 1995 SP	107	Solved	13.6	7.8	− ≈ 42.8	38.1	88.4	1,281	1,292	+ ≈ 0.9	57	880
	WT	Old Camp	140	NF	0.2	0.1	− ≈ 56	7	77.8	134	122	− ≈ 9.4	0	0
	WT	Rat Bayou	34	NF	53.2	24.5	− ≈ 53.9	10.9	79.5	2,822	2,826	+ ≈ 0.1	0	25
	WT	SL South 94 SP	513	NR	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	WT	SL 2004 CP	82	NR	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	WT	SL 2012 CP 2	365	Solved	23.2	12.8	− ≈ 45	24.2	82.5	4,146	4,178	+ ≈ 0.8	12	2,183
	WT	Walkers Point	107	Solved	11.4	5.9	− ≈ 47.9	22.4	81.6	593	596	+ ≈ 0.5	2	251
	VB	Bayou Blanc	15	NF	0	0	± 0	N/A	N/A	1,148	969	− ≈ 15.6	0	0
	VB	Big Charles	15	NF	0.4	0.2	− ≈ 40.2	34.5	85.4	2,944	2,632	− ≈ 10.6	0	0
	VB	Dry Reef	10	NF	0	0	± 0	N/A	N/A	375	331	− ≈ 11.8	0	0
	VB	Highspot	250	NF	0.4	0.2	− ≈ 45	19.5	83.1	706	639	− ≈ 9.5	0	0
	VB	Indian Point	100	NF	0.2	0.1	− ≈ 36.6	37	84	2,476	2,231	− ≈ 9.9	0	0

(*Continued*)

TABLE A7. (CONTINUED)

Salinity	Bay	Area	Acreage	Status	O_A	O_B	Δ O	L_A	L_B	C_A	C_B	Δ C	H_{SA}	H_{SE}
	VB	Lighthouse Point	30	NF	2.2	1.4	− ≈ 36.3	40.2	84.1	3,700	3,289	− ≈ 11.1	0	0
	VB	Middle Reef	20	NF	1	0.5	− ≈ 47.4	18	83.1	611	558	− ≈ 8.7	0	0
	VB	N. Reef	10	NF	0	0	± 0	N/A	N/A	1,085	923	− ≈ 15	0	0
	VB	Nickle Reef	100	NF	5.6	3.2	− ≈ 42.2	25.9	82.1	1,918	1,783	− ≈ 7	0	0
	VB	Rabbit	15	NF	0	0	± 0	N/A	N/A	1,174	997	− ≈ 15	0	0
	VB	Sally Shoals	5	NF	0	0	± 0	N/A	N/A	1,620	1,146	− ≈ 29.3	0	0
	LC	LC 2009 CP	295	SWC	3.6	1	− ≈ 73.6	90.3	108.9	4,550	4,570	+ ≈ 0.4	11,373	0
	LC	Big Washout	295	NF	0.6	0.4	− ≈ 27.4	68.7	94.2	1,802	1,635	− ≈ 9.3	0	0
	LC	Chenier Reef	10	SWC	18.4	9.2	− ≈ 50	42.5	84.6	9,170	9,180	+ ≈ 0.1	300	0
	LC	Lambert's 2015 CP	20	NF	1.2	0.9	− ≈ 24.2	88.7	110.3	7,530	6,841	− ≈ 9.2	0	0
	LC	Lamberts Reef	240	Solved	0.8	0.6	− ≈ 21.9	113.2	130.3	562	499	− ≈ 11.2	0	0
	LC	Little Washout	295	SWC	4.2	2.8	− ≈ 33.6	80.8	106	1,458	1,463	+ ≈ 0.3	1,819	0
	LC	Mid Lake	295	SWC	1.2	0.7	− ≈ 39.7	132.8	149.9	974	976	+ ≈ 0.3	3,153	0
	LC	N.E. Rabbit	366	SWC	2.2	1.5	− ≈ 30.4	72.9	103.6	382	383	+ ≈ 0.3	271	0
	LC	NW Rabbit Is.	755	SWC	9.4	0.8	− ≈ 91	84.7	84.1	172	212	+ ≈ 23.2	111,416	0
	LC	S.E. Rabbit	366	SWC	4.6	0.6	− ≈ 87.3	92.2	99	548	551	+ ≈ 0.6	27,105	0
	LC	West Cove Transplant	366	SWC	0.6	0.5	− ≈ 24.4	103.7	120.8	326	326	+ ≈ 0.1	139	0
	LC	W. Rabbit	755	SWC	20.8	1.4	− ≈ 93.3	85.8	83.3	508	567	+ ≈ 11.7	231,720	0
	LC	West Cove 2015 CP	25	SWC	15.2	10.7	− ≈ 29.9	64.2	95.4	3,582	3,580	− ≈ 0	0	0
	LC	West Cove Central	755	SWC	7	0.1	− ≈ 98.2	86.7	83.1	198	199	+ ≈ 0.7	71,462	0
Low	BM	3-Mile	1,020	NF	2.7	1.1	− ≈ 56.9	24.5	82	467	486	+ ≈ 4.1	0	0
	BM	Drum Bay	1,596	NF	8	3.3	− ≈ 58.5	22	82.1	2,803	2,708	− ≈ 3.4	0	0
	BM	E. Karako	1,020	NF	5.3	2.2	− ≈ 58.1	21.1	80.7	2,004	1,926	− ≈ 3.9	0	0
	BM	Martin	1,592	NF	0	0	± 0	N/A	N/A	197	176	− ≈ 10.3	0	0
	BM	Morgan Harbor	2,954	NR	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BM	Shell Point	47	NFO	139.7	58.7	− ≈ 58	22.4	82.3	6,097	9,408	+ ≈ 54.3	0	0
	BM	W. Karako	1,020	NF	0.3	0.1	− ≈ 57.8	22	84.6	53	56	+ ≈ 5.6	0	0
	MS	Cabbage Reef	1,804	NF	3	1.2	− ≈ 59.2	17.6	79.9	3,775	3,453	− ≈ 8.5	0	0
	MS	Grand Banks	1,066	NR	0	0	± 0	N/A	N/A	4,014	3,613	− ≈ 10	0	0
	MS	Grassy	1,804	NF	2	0.9	− ≈ 54.9	25.3	84.9	3,592	3,290	− ≈ 8.4	0	0
	MS	Halfmoon	1,066	NR	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	MS	Johnson Bayou	1,066	NR	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	MS	Millennium Reef	200	NF	0	0	± 0	N/A	N/A	1	0	− ≈ 30	0	0
	MS	Petit	1,066	NF	0.3	0.2	− ≈ 54.1	32	88	2,727	2,436	− ≈ 10.7	0	0
	MS	Round Island 2011 CP	1,066	NF	2.7	1.1	− ≈ 58.9	17.6	80.9	2175	1,707	− ≈ 21.5	0	0
	MS	Turkey Bayou	291	NF	0.3	0.1	− ≈ 62	52	87.6	3,543	3,358	− ≈ 5.2	0	0
	MS	Grand Pass	1,804	NFO	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	BS 2009 Lonesome CP	243	NFO	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	Battledore Reef	271	NF	0.3	0.1	− ≈ 59.7	57	88.6	287	275	− ≈ 3.9	0	0
	BS	Bay Long	923	NFO	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	Bayou Lost	275	NF	0	0	± 0	N/A	N/A	637	572	− ≈ 10.2	0	0
	BS	Black Bay	716	NF	0	0	± 0	N/A	N/A	10	9	− ≈ 10	0	0
	BS	California Bay	923	NR	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	Curfew	715	NR	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	E. Bay Crabe	511	NR	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	E. Bay Gardene	632	NR	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	E. Pelican	1,445	NR	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	E. Stone	829	NF	0.3	0.1	− ≈ 56.7	72	95.2	1100	1,014	− ≈ 7.8	0	0
	BS	Elephant Pass	202	NF	0	0	± 0	N/A	N/A	70	63	− ≈ 10	0	0
	BS	Horseshoe Reef	829	NF	5.7	2.3	− ≈ 60	3.2	74.7	167	172	+ ≈ 3.4	0	0
	BS	Jessie	275	NFO	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	Mangrove Point	1,445	NFO	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	N. Black Bay	829	NFO	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	N. Lake Fortuna	1,727	NFO	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	S. Black Bay	715	NF	0	0	± 0	N/A	N/A	357	321	− ≈ 10	0	0
	BS	S. Lake Fortuna	1,727	NFO	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	Snake	716	NFO	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	Stone	715	NF	0	0	± 0	N/A	N/A	163	147	− ≈ 10	0	0
	BS	Sunrise Point	923	NFO	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	Telegraph	715	NFO	0	0	± 0	N/A	N/A	0	0	± 0	0	0

(*Continued*)

TABLE A7. (CONTINUED)

Salinity	Bay	Area	Acreage	Status	O_A	O_B	Δ O	L_A	L_B	C_A	C_B	Δ C	H_{SA}	H_{SE}
	BS	W. Bay Crabe	511	NFO	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	BS	Wreck	4,486	NF	0	0	± 0	N/A	N/A	10	9	− ≈ 10	0	0
	BB	BB 2004 CP	40	NF	0	0	± 0	N/A	N/A	7,320	7,239	− ≈ 1.1	0	0
	HB	HB 2004 North SP	10	NFO	4	1.7	− ≈ 58	55.3	91.1	1,963	2,182	+ ≈ 11.1	0	0
	HB	HB 2004 South SP	25	NFO	5.3	2.2	− ≈ 58.2	46.7	89.1	1,375	1,606	+ ≈ 16.7	0	0
	HB	HB 2008 CP	50	NFO	18	7.4	− ≈ 58.8	24.5	81.6	3,373	3,709	+ ≈ 10	0	0
	HB	HB 2012 CP	200	NFO	15.7	6.6	− ≈ 57.8	26	83.1	1,727	2,051	+ ≈ 18.8	0	0
	HB	HB 2014 CP	30	NFO	5.7	2.5	− ≈ 56.3	57	91.4	710	1,029	+ ≈ 44.9	0	0
	HB	Lower Hackberry	5	NR	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	HB	Middle Hackberry	5	NFO	3.3	1.4	− ≈ 57.2	48	89.7	502	628	+ ≈ 25.1	0	0
	HB	Upper Hackberry	5	NF	0.7	0.3	− ≈ 58.9	44.5	81.9	1,478	1,170	− ≈ 20.9	0	0
	ET	Lake Chien 2004 CP	16	NF	1	0.4	− ≈ 56.8	18	83.8	3,332	3,285	− ≈ 1.4	0	0
	ET	Lake Chien 2009 CP	22	NF	0	0	± 0	N/A	N/A	28	27	− ≈ 3.6	0	0
	ET	Lake Felicity	40	NF	0	0	± 0	N/A	N/A	19	18	− ≈ 3.4	0	0
	WT	SL 2009 CP	156	Solved	20.4	7.4	− ≈ 63.6	31.4	84.5	2,683	2,688	+ ≈ 0.2	49	5,416
	WT	Buckskin Bayou Junop	17	NF	3.4	1.4	− ≈ 58.7	19.1	81.3	752	740	− ≈ 1.6	0	0
	WT	Grand Pass	107	Solved	18.2	5	− ≈ 72.5	26.3	83.2	714	714	+ ≈ 0.1	51	2,995
	WT	Junop Bayou DeWest	34	NF	3.4	1.4	− ≈ 58.4	11.7	79.1	808	768	− ≈ 4.9	0	0
	WT	Lake Mechant	30	NF	0	0	± 0	N/A	N/A	2,682	2,638	− ≈ 1.6	0	0
	WT	Mid SL 1994 SP	552	NR	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	WT	Mid Bay Junop	73	Solved	5.8	1.6	− ≈ 72.2	48.6	91.1	495	499	+ ≈ 0.8	106	1,605
	WT	Mid Sister Lake	56	NR	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	WT	SL North 1994 SP	191	NF	0.2	0.1	− ≈ 60.8	42	79.4	48	48	+ ≈ 0.1	0	31
	WT	SL North 1995 SP	107	Solved	13.6	4.3	− ≈ 68	38.1	87.1	1,281	1,293	+ ≈ 1	174	3,557
	WT	Old Camp	140	NF	0.2	0.1	− ≈ 59	7	75.9	134	123	− ≈ 8.8	0	0
	WT	Rat Bayou	34	NF	53.2	19.9	− ≈ 62.6	10.9	78.7	2,822	2,843	+ ≈ 0.7	7	653
	WT	SL South 94 SP	513	NR	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	WT	SL 2004 CP	82	NR	0	0	± 0	N/A	N/A	0	0	± 0	0	0
	WT	SL 2012 CP 2	365	Solved	23.2	8.9	− ≈ 61.4	24.2	82.4	4,146	4,164	+ ≈ 0.4	49	9,599
	WT	Walkers Point	107	Solved	11.4	3.7	− ≈ 67.4	22.4	82.2	593	595	+ ≈ 0.2	7	1,347
	VB	Bayou Blanc	15	NF	0	0	± 0	N/A	N/A	1,148	969	− ≈ 15.6	0	0
	VB	Big Charles	15	NF	0.4	0.2	− ≈ 58.4	34.5	84.5	2,944	2,640	− ≈ 10.3	0	0
	VB	Dry Reef	10	NF	0	0	± 0	N/A	N/A	375	331	− ≈ 11.8	0	0
	VB	Highspot	250	NF	0.4	0.2	− ≈ 54.7	19.5	82.9	706	643	− ≈ 8.9	0	0
	VB	Indian Point	100	NF	0.2	0.1	− ≈ 56.1	37	82.8	2,476	2,235	− ≈ 9.7	0	0
	VB	Lighthouse Point	30	NF	2.2	0.9	− ≈ 57.8	40.2	84.6	3,700	3,342	− ≈ 9.7	0	0
	VB	Middle Reef	20	NF	1	0.4	− ≈ 56.8	18	82.2	611	569	− ≈ 6.8	0	0
	VB	N. Reef	10	NF	0	0	± 0	N/A	N/A	1,085	923	− ≈ 15	0	0
	VB	Nickle Reef	100	NF	5.6	2.4	− ≈ 57.1	25.9	83.2	1,918	1,879	− ≈ 2	0	0
	VB	Rabbit	15	NF	0	0	± 0	N/A	N/A	1,174	997	− ≈ 15	0	0
	VB	Sally Shoals	5	NF	0	0	± 0	N/A	N/A	1,620	1,146	− ≈ 29.3	0	0
	LC	LC 2009 CP	295	SWC	3.6	0.2	− ≈ 95.2	90.3	95.3	4,550	4,567	+ ≈ 0.4	14,894	0
	LC	Big Washout	295	NF	0.6	0.2	− ≈ 58.4	68.7	92.8	1,802	1,659	− ≈ 8	0	0
	LC	Chenier Reef	10	SWC	18.4	5.3	− ≈ 71.3	42.5	82.5	9,170	9,338	+ ≈ 1.8	516	0
	LC	Lambert's 2015 CP	20	NF	1.2	0.5	− ≈ 57	88.7	106.7	7,530	6,919	− ≈ 8.1	0	0
	LC	Lamberts Reef	240	Solved	0.8	0.3	− ≈ 61.7	113.2	126.2	562	567	+ ≈ 0.8	542	0
	LC	Little Washout	295	SWC	4.2	0.7	− ≈ 84.2	80.8	95.4	1,458	1,463	+ ≈ 0.4	11,466	0
	LC	Mid Lake	295	SWC	1.2	0.1	− ≈ 90.3	132.8	145.8	974	975	+ ≈ 0.1	10,231	0
	LC	N.E. Rabbit	366	SWC	2.2	0.4	− ≈ 82.4	72.9	94.2	382	382	+ ≈ 0.1	6,461	0
	LC	NW Rabbit Is.	755	SWC	9.4	0.5	− ≈ 94.6	84.7	83	172	290	+ ≈ 68.3	107,367	0
	LC	S.E. Rabbit	366	SWC	4.6	0.2	− ≈ 94.7	92.2	82	548	561	+ ≈ 2.4	27,529	0
	LC	West Cove Transplant	366	SWC	0.6	0.1	− ≈ 86.2	103.7	116.6	326	328	+ ≈ 0.5	2,919	0
	LC	W. Rabbit	755	SWC	20.8	0.6	− ≈ 97.1	85.8	82.9	508	705	+ ≈ 38.7	225,818	0
	LC	West Cove 2015 CP	25	SWC	15.2	2.9	− ≈ 81.1	64.2	86.5	3,582	3,594	+ ≈ 0.3	2,295	0
	LC	West Cove Central	755	SWC	7	0.1	− ≈ 98.7	86.7	83	198	241	+ ≈ 21.7	67,748	0

TABLE A8.

Louisiana oyster density/cultch density standard (OCS) simulation results. Salinity is the monthly salinity scenario (Table 3). Bay is the location (Fig. 1) of the reef, shell plant (SP), or cultch plant (CP). Area is the simulated unit, the size of which is given in acres. Simulation status is: solved, solved within conditions (SWC), not fishable (NF), no fishing occurred (NFO). O_A and O_B are the oyster densities (no./m^2) at the start and end of the simulation, respectively; Δ O is the percent change in oyster density; L_A and L_B are the oyster lengths at the start and end of the simulation, respectively; C_A and C_B are the cultch density (g/m^2) at the start and end of the simulation, respectively; Δ C is the percent change in cultch density; H_{SA} is the harvest of sack oysters; H_{SE} is the harvest of seed oysters.

Salinity	Bay	Area	Acreage	Status	O_A	O_B	Δ O	L_A	L_B	C_A	C_B	Δ C	H_{SA}	H_{SE}
High	CS	Martin	1,592	NF	0	0	0	N/A	N/A	197	176	− ≈ 10.3	0	0
	MS	Cabbage Reef	1,804	NF	3	1.5	− ≈ 49.9	17.6	69.6	3,775	3,412	− ≈ 9.6	0	0
	MS	Grand Banks	1,066	NF	0	0	0	N/A	N/A	4,014	3,613	− ≈ 10	0	0
	MS	Grand Pass	1,804	NF	2	1.1	− ≈ 43.1	25.3	76.3	3,592	3,248	− ≈ 9.6	0	0
	MS	Grassy	1,066	NR	0	0	0	N/A	N/A	0	0	0	0	0
	MS	Halfmoon	1,066	NR	0	0	0	N/A	N/A	0	0	0	0	0
	MS	Johnson Bayou	200	NF	0	0	0	N/A	N/A	0.66	0.46	− ≈ 30	0	0
	MS	Millennium Reef	1,066	NF	0.3	0.2	− ≈ 40	32	82.2	2,727	2,427	− ≈ 11	0	0
	MS	Petit	1,066	NF	2.7	1.3	− ≈ 50	17.6	70.7	2,175	1,668	− ≈ 23.3	0	0
	MS	Round Island 2011 CP	291	NF	0.3	0.2	− ≈ 44.4	52	80.7	3,543	3,348	− ≈ 5.5	0	0
	MS	Turkey Bayou	1,804	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BM	3-Mile	1,020	NF	2.7	1.5	− ≈ 45.3	24.5	75.7	467	436	− ≈ 6.5	0	0
	BM	Drum Bay	1,796	NF	8	3.7	− ≈ 54	22	69.9	2,803	2,636	− ≈ 6	0	0
	BM	E. Karako	1,020	NF	5.3	2.8	− ≈ 46.7	21.1	72.7	2,004	1,835	− ≈ 8.4	0	0
	BM	Morgan Harbor	2,954	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BM	Shell Point	47	NF	139.7	74.5	− ≈ 46.7	22.4	73.1	6,097	6,908	+ ≈ 13.3	0	0
	BM	W. Karako	1,020	NF	0.3	0.2	− ≈ 46.5	22	72.2	53	50	− ≈ 6.5	0	0
	BS	Lonesome 2009 CP	243	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	Battledore Reef	271	NF	0.3	0.2	− ≈ 52.3	57	80.9	287	268	− ≈ 6.4	0	0
	BS	Bay Long	923	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	Bayou Lost	275	NF	0	0	0	N/A	N/A	637	572	− ≈ 10.2	0	0
	BS	Black Bay	716	NF	0	0	0	N/A	N/A	10	9	− ≈ 10	0	0
	BS	California Bay	923	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	Curfew	715	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	E. Bay Crabe	511	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	E. Bay Gardene	632	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	E. Pelican	1,445	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	E. Stone	829	NF	0.3	0	− ≈ 87.6	72	94	1,100	1,017	− ≈ 7.5	0	0
	BS	Elephant Pass	202	NF	0	0	0	N/A	N/A	70	63	− ≈ 10	0	0
	BS	Horseshoe Reef	829	NF	5.7	2.3	− ≈ 59.3	3.2	61.3	167	162	− ≈ 3	0	0
	BS	Jessie	275	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	Mangrove Point	1,445	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	N. Black Bay	829	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	N. Lake Fortuna	1,727	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	S. Black Bay	715	NF	0	0	0	N/A	N/A	357	321	− ≈ 10	0	0
	BS	S. Lake Fortuna	1,727	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	Snake	716	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	Stone	715	NF	0	0	0	N/A	N/A	163	147	− ≈ 10	0	0
	BS	Sunrise Point	923	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	Telegraph	715	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	W. Bay Crabe	511	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	Wreck	4,486	NF	0	0	0	N/A	N/A	10	9	− ≈ 10	0	0
	BB	BB 2004 CP	40	NF	0	0	0	N/A	N/A	7,320	7,239	− ≈ 1.1	0	0
	HB	N. Hackberry 2004 SP	10	NF	4	1.5	− ≈ 63	55.3	80.4	1,963	2,172	+ ≈ 10.6	0	0
	HB	S. Hackberry 2004 SP	25	NF	5.3	2.2	− ≈ 59.7	46.7	77.3	1,375	1,568	+ ≈ 14	0	0
	HB	HB 2008 CP	50	NF	18	8.9	− ≈ 50.7	24.5	72.1	3,373	3,463	+ ≈ 2.7	0	0
	HB	HB 2012 CP	200	NF	15.7	7.7	− ≈ 51.1	26	72.8	1,727	1,836	+ ≈ 6.4	0	0
	HB	HB 2014 CP	30	NF	5.7	2.1	− ≈ 63.3	57	81.9	710	1,025	+ ≈ 44.4	0	0
	HB	Lower Hackberry	5	NR	0	0	0	N/A	N/A	0	0	0	0	0
	HB	Middle Hackberry	5	NF	3.3	1.5	− ≈ 56.5	48	80.9	502	611	+ ≈ 21.7	0	0
	HB	Upper Hackberry	5	NF	0.7	0.4	− ≈ 42.6	44.5	80.4	1,478	1,156	− ≈ 21.8	0	0

(*Continued*)

TABLE A8. (CONTINUED)

Salinity	Bay	Area	Acreage	Status	O_A	O_B	Δ O	L_A	L_B	C_A	C_B	Δ C	H_{SA}	H_{SE}
	ET	Lake Chien 2004 CP	16	NF	1	0.5	− ≈ 48.7	18	69.1	3,332	3,270	− ≈ 1.9	0	0
	ET	Lake Chien 2009 CP	22	NF	0	0	0	N/A	N/A	28	27	− ≈ 3.6	0	0
	ET	Lake Felicity	40	NF	0	0	0	N/A	N/A	19	18	− ≈ 3.4	0	0
	WT	SL 2009 CP	156	NF	20.4	11.4	− ≈ 44.2	31.4	77.9	2,683	2,865	+ ≈ 6.8	0	0
	WT	Buckskin Bayou Junop	17	NF	3.4	1.7	− ≈ 49	19.1	70.6	752	689	− ≈ 8.5	0	0
	WT	Grand Pass	107	NF	18.2	9.6	− ≈ 47.4	26.3	74.9	714	812	+ ≈ 13.8	0	0
	WT	Junop Bayou DeWest	34	NF	3.4	1.6	− ≈ 53.2	11.7	65.2	808	738	− ≈ 8.6	0	0
	WT	Lake Mechant	30	NF	0	0	0	N/A	N/A	2,682	2,638	− ≈ 1.6	0	0
	WT	Mid 1994 SP	552	NR	0	0	0	N/A	N/A	0	0	0	0	0
	WT	Mid Bay Junop	73	NF	5.8	2.3	− ≈ 59.5	48.6	79	495	757	+ ≈ 53.1	0	0
	WT	Mid Sister Lake	56	NR	0	0	0	N/A	N/A	0	0	0	0	0
	WT	N. 1994 SP	191	NF	0.2	0.1	− ≈ 42.6	42	77.9	48	46	− ≈ 3	0	0
	WT	N. 1995 SP	107	NF	13.6	6.6	− ≈ 51.8	38.1	77.3	1,281	1,603	+ ≈ 25.2	0	0
	WT	Old Camp	140	NF	0.2	0.1	− ≈ 56	7	62.2	134	121	− ≈ 9.6	0	0
	WT	Rat Bayou	34	NF	53.2	24.2	− ≈ 54.5	10.9	64.8	2,822	2,804	− ≈ 0.7	0	0
	WT	SL 1994 SP	513	NR	0	0	0	N/A	N/A	0	0	0	0	0
	WT	SL 2004 CP	82	NR	0	0	0	N/A	N/A	0	0	0	0	0
	WT	SL 2012 CP 2	365	NF	23.2	12.3	− ≈ 46.9	24.2	74	4,146	4,240	+ ≈ 2.3	0	0
	WT	Walkers Point	107	NF	11.4	5.9	− ≈ 48.3	22.4	73.2	593	609	+ ≈ 2.7	0	0
	VB	Bayou Blanc	15	NF	0	0	0	N/A	N/A	1,148	969	− ≈ 15.6	0	0
	VB	Big Charles	15	NF	0.4	0.2	− ≈ 44.6	34.5	77.7	2,944	2,632	− ≈ 10.6	0	0
	VB	Dry Reef	10	NF	0	0	0	N/A	N/A	375	331	− ≈ 11.8	0	0
	VB	Highspot	250	NF	0.4	0.2	− ≈ 46	19.5	71.3	706	637	− ≈ 9.7	0	0
	VB	Indian Point	100	NF	0.2	0.1	− ≈ 42.5	37	80.5	2,476	2,231	− ≈ 9.9	0	0
	VB	Lighthouse Point	30	NF	2.2	1.2	− ≈ 43.7	40.2	79.7	3,700	3,292	− ≈ 11	0	0
	VB	Middle Reef	20	NF	1	0.5	− ≈ 48.2	18	70.1	611	554	− ≈ 9.2	0	0
	VB	N. Reef	10	NF	0	0	0	N/A	N/A	1,085	923	− ≈ 15	0	0
	VB	Nickle Reef	100	NF	5.6	3.1	− ≈ 44.5	25.9	75.5	1,918	1,767	− ≈ 7.9	0	0
	VB	Rabbit	15	NF	0	0	0	N/A	N/A	1,174	997	− ≈ 15	0	0
	VB	Sally Shoals	5	NF	0	0	0	N/A	N/A	1,620	1,146	− ≈ 29.3	0	0
	LC	LC 2009 CP	295	NF	3.6	0.6	− ≈ 83.3	90.3	100	4,550	5,001	+ ≈ 9.9	0	0
	LC	Big Washout	295	NF	0.6	0.2	− ≈ 73.4	68.7	85.3	1,802	1,659	− ≈ 7.9	0	0
	LC	Chenier Reef	10	NF	18.4	8.6	− ≈ 53.3	42.5	77.9	9,170	9,477	+ ≈ 3.3	0	0
	LC	Lambert's 2015 CP	20	NF	1.2	0.2	− ≈ 81.7	88.7	98.3	7,530	6,953	− ≈ 7.7	0	0
	LC	Lamberts Reef	240	NF	0.8	0.1	− ≈ 88.2	113.2	129	562	626	+ ≈ 11.4	0	0
	LC	Little Washout	295	NF	4.2	0.9	− ≈ 79	80.8	94.1	1,458	1,797	+ ≈ 23.2	0	0
	LC	Mid Lake	295	NF	1.2	0.1	− ≈ 88.2	132.8	148	974	1,293	+ ≈ 32.8	0	0
	LC	N.E. Rabbit	366	NF	2.2	0.5	− ≈ 76.6	72.9	86	382	537	+ ≈ 40.6	0	0
	LC	N.W. Rabbit Is.	755	NF	9.4	2	− ≈ 79.1	84.7	94.2	172	1,508	+ ≈ 776.5	0	0
	LC	S.E. Rabbit	366	NF	4.6	0.9	− ≈ 81.2	92.2	99.1	548	1,222	+ ≈ 123	0	0
	LC	W. Cove Transplant	366	NF	0.6	0.1	− ≈ 88.2	103.7	119	326	405	+ ≈ 24.2	0	0
	LC	W. Rabbit	755	NF	20.8	4	− ≈ 81	85.8	96.3	508	3,267	+ ≈ 543.2	0	0
	LC	W. Cove 2015 CP	25	NF	15.2	5.2	− ≈ 65.5	64.2	83.7	3,582	4,213	+ ≈ 17.6	0	0
	LC	W. Cove Central	755	NF	7	1	− ≈ 85.5	86.7	100	198	1,043	+ ≈ 426.9	0	0
Moderate	CS	Martin	1,592	NF	0	0	0	N/A	N/A	197	176	− ≈ 10.3	0	0
	MS	Cabbage Reef	1,804	NF	3	1.5	− ≈ 49	17.6	81.2	3,775	3,421	− ≈ 9.4	0	0
	MS	Grand Banks	1,066	NF	0	0	0	N/A	N/A	4,014	3,613	− ≈ 10	0	0
	MS	Grand Pass	1,804	NF	2	1.2	− ≈ 41.1	25.3	82	3,592	3,255	− ≈ 9.4	0	0
	MS	Grassy	1,066	NR	0	0	0	N/A	N/A	0	0	0	0	0
	MS	Halfmoon	1,066	NR	0	0	0	N/A	N/A	0	0	0	0	0
	MS	Johnson Bayou	200	NF	0	0	0	N/A	N/A	0.66	0.44	− ≈ 30	0	0
	MS	Millennium Reef	1,066	NF	0.3	0.2	− ≈ 36.6	32	79	2,727	2,428	− ≈ 11	0	0
	MS	Petit	1,066	NF	2.7	1.4	− ≈ 48.9	17.6	80.5	2,175	1,675	− ≈ 23	0	0
	MS	Round Island 2011 CP	291	NF	0.3	0.2	− ≈ 34.2	52	84.6	3,543	3,347	− ≈ 5.6	0	0
	MS	Turkey Bayou	1,804	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BM	3-Mile	1,020	NF	2.7	1.5	− ≈ 43	24.5	80.6	467	443	− ≈ 5.1	0	0
	BM	Drum Bay	1,796	NF	8	4.2	− ≈ 47.7	22	83.4	2,803	2,599	− ≈ 7.3	0	0
	BM	E. Karako	1,020	NF	5.3	2.9	− ≈ 45.4	21.1	81.7	2,004	1,854	− ≈ 7.5	0	0
	BM	Morgan Harbor	2,954	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BM	Shell Point	47	NFO	139.7	76.8	− ≈ 45	22.4	82.4	6,097	7,351	+ ≈ 20.6	0	0

(*Continued*)

TABLE A8. (CONTINUED)

Salinity	Bay	Area	Acreage	Status	O_A	O_B	Δ O	L_A	L_B	C_A	C_B	Δ C	H_{SA}	H_{SE}
	BM	W. Karako	1,020	NF	0.3	0.2	− ≈ 45.4	22	85.3	53	51	− ≈ 3.9	0	0
	BS	Lonesome 2009 CP	243	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	Battledore Reef	271	NF	0.3	0.2	− ≈ 31.4	57	89.5	287	265	− ≈ 7.7	0	0
	BS	Bay Long	923	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	Bayou Lost	275	NF	0	0	0	N/A	N/A	637	572	− ≈ 10.2	0	0
	BS	Black Bay	716	NF	0	0	0	N/A	N/A	10	9	− ≈ 10	0	0
	BS	California Bay	923	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	Curfew	715	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	E. Bay Crabe	511	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	E. Bay Gardene	632	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	E. Pelican	1,445	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	E. Stone	829	NF	0.3	0.2	− ≈ 26.2	72	97.7	1,100	1,000	− ≈ 9.1	0	0
	BS	Elephant Pass	202	NF	0	0	0	N/A	N/A	70	63	− ≈ 10	0	0
	BS	Horseshoe Reef	829	NF	5.7	2.3	− ≈ 59.3	3.2	72.3	167	166	− ≈ 0.3	0	0
	BS	Jessie	275	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	Mangrove Point	1,445	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	N. Black Bay	829	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	N. Lake Fortuna	1,727	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	S. Black Bay	715	NF	0	0	0	N/A	N/A	357	321	− ≈ 10	0	0
	BS	S. Lake Fortuna	1,727	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	Snake	716	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	Stone	715	NF	0	0	0	N/A	N/A	163	147	− ≈ 10	0	0
	BS	Sunrise Point	923	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	Telegraph	715	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	W. Bay Crabe	511	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	Wreck	4,486	NF	0	0	0	N/A	N/A	10	9	− ≈ 10	0	0
	BB	BB 2004 CP	40	NF	0	0	0	N/A	N/A	7,320	7,239	− ≈ 1.1	0	0
	HB	N. Hackberry 2004 SP	10	NF	4	2.7	− ≈ 33.2	55.3	94	1,963	2,040	+ ≈ 3.9	0	0
	HB	S. Hackberry 2004 SP	25	NF	5.3	3.4	− ≈ 36.5	46.7	91	1,375	1,450	+ ≈ 5.5	0	0
	HB	HB 2008 CP	50	NF	18	9.8	− ≈ 45.4	24.5	82.8	3,373	3,445	+ ≈ 2.1	0	0
	HB	HB 2012 CP	200	NF	15.7	8.7	− ≈ 44.3	26	83.6	1,727	1,804	+ ≈ 4.5	0	0
	HB	HB 2014 CP	30	NF	5.7	3.9	− ≈ 30.9	57	94.1	710	831	+ ≈ 17	0	0
	HB	Lower Hackberry	5	NR	0	0	0	N/A	N/A	0	0	0	0	0
	HB	Middle Hackberry	5	NF	3.3	2.2	− ≈ 35.1	48	90.5	502	521	+ ≈ 3.7	0	0
	HB	Upper Hackberry	5	NF	0.7	0.4	− ≈ 35	44.5	83.1	1,478	1,155	− ≈ 21.9	0	0
	ET	Lake Chien 2004 CP	16	NF	1	0.5	− ≈ 48.1	18	84.5	3,332	3,274	− ≈ 1.7	0	0
	ET	Lake Chien 2009 CP	22	NF	0	0	0	N/A	N/A	28	27	− ≈ 3.6	0	0
	ET	Lake Felicity	40	NF	0	0	0	N/A	N/A	19	18	− ≈ 3.4	0	0
	WT	SL 2009 CP	156	NF	20.4	12.6	− ≈ 38.4	31.4	83.5	2,683	2,866	+ ≈ 6.8	0	0
	WT	Buckskin Bayou Junop	17	NF	3.4	1.8	− ≈ 47.9	19.1	81.8	752	699	− ≈ 7.1	0	0
	WT	Grand Pass	107	NF	18.2	10.4	− ≈ 42.9	26.3	82.8	714	812	+ ≈ 13.8	0	0
	WT	Junop Bayou DeWest	34	NF	3.4	1.6	− ≈ 52.9	11.7	80.2	808	746	− ≈ 7.7	0	0
	WT	Lake Mechant	30	NF	0	0	0	N/A	N/A	2,682	2,638	− ≈ 1.6	0	0
	WT	Mid 1994 SP	552	NR	0	0	0	N/A	N/A	0	0	0	0	0
	WT	Mid Bay Junop	73	NF	5.8	3.7	− ≈ 36.6	48.6	94.2	495	574	+ ≈ 16.1	0	0
	WT	Mid Sister Lake	56	NR	0	0	0	N/A	N/A	0	0	0	0	0
	WT	N. 1994 SP	191	NF	0.2	0.1	− ≈ 35	42	80.6	48	46	− ≈ 3.8	0	0
	WT	N. 1995 SP	107	NF	13.6	8.3	− ≈ 38.8	38.1	88.5	1,281	1,379	+ ≈ 7.7	0	0
	WT	Old Camp	140	NF	0.2	0.1	− ≈ 56	7	77.8	134	122	− ≈ 9.4	0	0
	WT	Rat Bayou	34	NF	53.2	24.6	− ≈ 53.7	10.9	79.5	2,822	2,837	+ ≈ 0.5	0	0
	WT	SL 1994 SP	513	NR	0	0	0	N/A	N/A	0	0	0	0	0
	WT	SL 2004 CP	82	NR	0	0	0	N/A	N/A	0	0	0	0	0
	WT	SL 2012 CP 2	1	NF	23.2	13.1	− ≈ 43.7	24.2	82.5	4,146	4,279	+ ≈ 3.2	0	0
	WT	Walkers Point	107	NF	11.4	6.2	− ≈ 45.4	22.4	81.6	593	626	+ ≈ 5.4	0	0
	VB	Bayou Blanc	15	NF	0	0	0	N/A	N/A	1,148	969	− ≈ 15.6	0	0
	VB	Big Charles	15	NF	0.4	0.2	− ≈ 40.2	34.5	85.4	2,944	2,632	− ≈ 10.6	0	0
	VB	Dry Reef	10	NF	0	0	0	N/A	N/A	375	331	− ≈ 11.8	0	0
	VB	Highspot	250	NF	0.4	0.2	− ≈ 45	19.5	83.1	706	639	− ≈ 9.5	0	0
	VB	Indian Point	100	NF	0.2	0.1	− ≈ 36.6	37	84	2,476	2,231	− ≈ 9.9	0	0
	VB	Lighthouse Point	30	NF	2.2	1.4	− ≈ 36.3	40.2	84.1	3,700	3,289	− ≈ 11.1	0	0

(*Continued*)

TABLE A8. (CONTINUED)

Salinity	Bay	Area	Acreage	Status	O_A	O_B	Δ O	L_A	L_B	C_A	C_B	Δ C	H_{SA}	H_{SE}
	VB	Middle Reef	20	NF	1	0.5	− ≈ 47.4	18	83.1	611	558	− ≈ 8.7	0	0
	VB	N. Reef	10	NF	0	0	0	N/A	N/A	1,085	923	− ≈ 15	0	0
	VB	Nickle Reef	100	NF	5.6	3.2	− ≈ 42.2	25.9	82.1	1,918	1,783	− ≈ 7	0	0
	VB	Rabbit	15	NF	0	0	0	N/A	N/A	1,174	997	− ≈ 15	0	0
	VB	Sally Shoals	5	NF	0	0	0	N/A	N/A	1,620	1,146	− ≈ 29.3	0	0
	LC	LC 2009 CP	295	NF	3.6	2.7	− ≈ 24.2	90.3	112	4,550	4,654	+ ≈ 2.3	0	0
	LC	Big Washout	295	NF	0.6	0.4	− ≈ 27.4	68.7	94.2	1,802	1,635	− ≈ 9.3	0	0
	LC	Chenier Reef	10	NF	18.4	11.6	− ≈ 37	42.5	87.2	9,170	9,249	+ ≈ 0.9	0	0
	LC	Lambert's 2015 CP	20	NF	1.2	0.9	− ≈ 24.2	88.7	110	7,530	6,841	− ≈ 9.2	0	0
	LC	Lamberts Reef	240	NF	0.8	0.6	− ≈ 21.9	113.2	130	562	499	− ≈ 11.2	0	0
	LC	Little Washout	295	NF	4.2	3.1	− ≈ 26.2	80.8	106	1,458	1,475	+ ≈ 1.2	0	0
	LC	Mid Lake	295	NF	1.2	0.9	− ≈ 21.9	132.8	150	974	997	+ ≈ 2.4	0	0
	LC	N.E. Rabbit	366	NF	2.2	1.6	− ≈ 28.7	72.9	104	382	385	+ ≈ 0.7	0	0
	LC	N.W. Rabbit Is.	755	NF	9.4	6.9	− ≈ 26.2	84.7	110	172	588	+ ≈ 241.6	0	0
	LC	S.E. Rabbit	366	NF	4.6	3.4	− ≈ 25.4	92.2	117	548	721	+ ≈ 31.5	0	0
	LC	W. Cove Trans	366	NF	0.6	0.5	− ≈ 21.9	103.7	121	326	327	+ ≈ 0.3	0	0
	LC	W. Rabbit	755	NF	20.8	15.5	− ≈ 25.4	85.8	110	508	1,363	+ ≈ 168.3	0	0
	LC	W. Cove 2015 CP	25	NF	15.2	10.7	− ≈ 29.9	64.2	95.4	3,582	3,580	− ≈ 0	0	0
	LC	W. Cove Central	755	NF	7	5.3	− ≈ 23.6	86.7	107	198	450	+ ≈ 127.1	0	0
Low	CS	Martin	1,592	NF	0	0	0	N/A	N/A	197	176	− ≈ 10.3	0	0
	MS	Cabbage Reef	1,804	NF	3	1.2	− ≈ 59.2	17.6	79.9	3,775	3,453	− ≈ 8.5	0	0
	MS	Grand Banks	1,066	NF	0	0	0	N/A	N/A	4,014	3,613	− ≈ 10	0	0
	MS	Grand Pass	1,804	NF	2	0.9	− ≈ 54.9	25.3	84.9	3,592	3,290	− ≈ 8.4	0	0
	MS	Grassy	1,066	NR	0	0	0	N/A	N/A	0	0	0	0	0
	MS	Halfmoon	1,066	NR	0	0	0	N/A	N/A	0	0	0	0	0
	MS	Johnson Bayou	200	NF	0	0	0	N/A	N/A	0.66	0.44	− ≈ 30	0	0
	MS	Millennium Reef	1,066	NF	0.3	0.2	− ≈ 54.1	32	88	2,727	2,436	− ≈ 10.7	0	0
	MS	Petit	1,066	NF	2.7	1.1	− ≈ 58.9	17.6	80.9	2,175	1,707	− ≈ 21.5	0	0
	MS	Round Island 2011 CP	291	NF	0.3	0.1	− ≈ 62	52	87.6	3,543	3,358	− ≈ 5.2	0	0
	MS	Turkey Bayou	1,804	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BM	3-Mile	1,020	NF	2.7	1.1	− ≈ 56.9	24.5	82	467	486	+ ≈ 4.1	0	0
	BM	Drum Bay	1,796	NF	8	3.3	− ≈ 58.5	22	82.1	2,803	2,708	− ≈ 3.4	0	0
	BM	E. Karako	1,020	NF	5.3	2.2	− ≈ 58.1	21.1	80.7	2,004	1,926	− ≈ 3.9	0	0
	BM	Morgan Harbor	2,954	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BM	Shell Point	47	NFO	139.7	58.7	− ≈ 58	22.4	82.3	6,097	9,408	+ ≈ 54.3	0	0
	BM	W. Karako	1,020	NF	0.3	0.1	− ≈ 57.8	22	84.6	53	56	+ ≈ 5.6	0	0
	BS	Lonesome 2009 CP	243	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	Battledore Reef	271	NF	0.3	0.1	− ≈ 59.7	57	88.6	287	275	− ≈ 3.9	0	0
	BS	Bay Long	923	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	Bayou Lost	275	NF	0	0	0	N/A	N/A	637	572	− ≈ 10.2	0	0
	BS	Black Bay	716	NF	0	0	0	N/A	N/A	10	9	− ≈ 10	0	0
	BS	California Bay	923	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	Curfew	715	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	E. Bay Crabe	511	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	E. Bay Gardene	632	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	E. Pelican	1,445	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	E. Stone	829	NF	0.3	0.1	− ≈ 56.7	72	95.2	1,100	1,014	− ≈ 7.8	0	0
	BS	Elephant Pass	202	NF	0	0	0	N/A	N/A	70	63	− ≈ 10	0	0
	BS	Horseshoe Reef	829	NF	5.7	2.3	− ≈ 60	3.2	74.7	167	172	+ ≈ 3.4	0	0
	BS	Jessie	275	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	Mangrove Point	1,445	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	N. Black Bay	829	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	N. Lake Fortuna	1,727	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	S. Black Bay	715	NF	0	0	0	N/A	N/A	357	321	− ≈ 10	0	0
	BS	S. Lake Fortuna	1,727	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	Snake	716	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	Stone	715	NF	0	0	0	N/A	N/A	163	147	− ≈ 10	0	0
	BS	Sunrise Point	923	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	Telegraph	715	NR	0	0	0	N/A	N/A	0	0	0	0	0
	BS	W. Bay Crabe	511	NR	0	0	0	N/A	N/A	0	0	0	0	0

(*Continued*)

TABLE A8. (CONTINUED)

Salinity	Bay	Area	Acreage	Status	O_A	O_B	ΔO	L_A	L_B	C_A	C_B	ΔC	H_{SA}	H_{SE}
	BS	Wreck	4,486	NF	0	0	0	N/A	N/A	10	9	− ≈ 10	0	0
	BB	BB 2004 CP	40	NF	0	0	0	N/A	N/A	7,320	7,239	− ≈ 1.1	0	0
	HB	N. Hackberry 2004 SP	10	NF	4	1.7	− ≈ 58	55.3	91.1	1,963	2,182	+ ≈ 11.1	0	0
	HB	S. Hackberry 2004 SP	25	NF	5.3	2.2	− ≈ 58.2	46.7	89.1	1,375	1,606	+ ≈ 16.7	0	0
	HB	HB 2008 CP	50	NF	18	7.4	− ≈ 58.8	24.5	81.6	3,373	3,709	+ ≈ 10	0	0
	HB	HB 2012 CP	200	NF	15.7	6.6	− ≈ 57.8	26	83.1	1,727	2,051	+ ≈ 18.8	0	0
	HB	HB 2014 CP	30	NF	5.7	2.5	− ≈ 56.3	57	91.4	710	1,029	+ ≈ 44.9	0	0
	HB	Lower Hackberry	5	NR	0	0	0	N/A	N/A	0	0	0	0	0
	HB	Middle Hackberry	5	NF	3.3	1.4	− ≈ 57.2	48	89.7	502	628	+ ≈ 25.1	0	0
	HB	Upper Hackberry	5	NF	0.7	0.3	− ≈ 58.9	44.5	81.9	1,478	1,170	− ≈ 20.9	0	0
	ET	Lake Chien 2004 CP	16	NF	1	0.4	− ≈ 56.8	18	83.8	3,332	3,285	− ≈ 1.4	0	0
	ET	Lake Chien 2009 CP	22	NF	0	0	0	N/A	N/A	28	27	− ≈ 3.6	0	0
	ET	Lake Felicity	40	NF	0	0	0	N/A	N/A	19	18	− ≈ 3.4	0	0
	WT	SL 2009 CP	156	NF	20.4	9.1	− ≈ 55.5	31.4	84.5	2,683	3,279	+ ≈ 22.2	0	0
	WT	Buckskin Bayou Junop	17	NF	3.4	1.4	− ≈ 58.7	19.1	81.3	752	740	− ≈ 1.6	0	0
	WT	Grand Pass	107	NF	18.2	7.8	− ≈ 57	26.3	83.3	714	1,120	+ ≈ 56.9	0	0
	WT	Junop Bayou DeWest	34	NF	3.4	1.4	− ≈ 58.4	11.7	79.1	808	768	− ≈ 4.9	0	0
	WT	Lake Mechant	30	NF	0	0	0	N/A	N/A	2,682	2,638	− ≈ 1.6	0	0
	WT	Mid 1994 SP	552	NR	0	0	0	N/A	N/A	0	0	0	0	0
	WT	Mid Bay Junop	73	NF	5.8	2.5	− ≈ 57.1	48.6	91.5	495	766	+ ≈ 54.7	0	0
	WT	Mid Sister Lake	56	NR	0	0	0	N/A	N/A	0	0	0	0	0
	WT	N. 1994 SP	191	NF	0.2	0.1	− ≈ 58.9	42	79.4	48	50	+ ≈ 5	0	0
	WT	N. 1995 SP	107	NF	13.6	5.9	− ≈ 56.9	38.1	87.3	1,281	1,738	+ ≈ 35.7	0	0
	WT	Old Camp	140	NF	0.2	0.1	− ≈ 59	7	75.9	134	123	− ≈ 8.8	0	0
	WT	Rat Bayou	34	NF	53.2	22.1	− ≈ 58.4	10.9	78.7	2,822	3,166	+ ≈ 12.2	0	0
	WT	SL 1994 SP	513	NR	0	0	0	N/A	N/A	0	0	0	0	0
	WT	SL 2004 CP	82	NR	0	0	0	N/A	N/A	0	0	0	0	0
	WT	SL 2012 CP 2	365	NF	23.2	10	− ≈ 57	24.2	82.4	4,146	4,636	+ ≈ 11.8	0	0
	WT	Walkers Point	107	NF	11.4	4.9	− ≈ 57	22.4	82.2	593	785	+ ≈ 32.3	0	0
	VB	Bayou Blanc	15	NF	0	0	0	N/A	N/A	1,148	969	− ≈ 15.6	0	0
	VB	Big Charles	15	NF	0.4	0.2	− ≈ 58.4	34.5	84.5	2,944	2,640	− ≈ 10.3	0	0
	VB	Dry Reef	10	NF	0	0	0	N/A	N/A	375	331	− ≈ 11.8	0	0
	VB	Highspot	250	NF	0.4	0.2	− ≈ 54.7	19.5	82.9	706	643	− ≈ 8.9	0	0
	VB	Indian Point	100	NF	0.2	0.1	− ≈ 56.1	37	82.8	2,476	2,235	− ≈ 9.7	0	0
	VB	Lighthouse Point	30	NF	2.2	0.9	− ≈ 57.8	40.2	84.6	3,700	3,342	− ≈ 9.7	0	0
	VB	Middle Reef	20	NF	1	0.4	− ≈ 56.8	18	82.2	611	569	− ≈ 6.8	0	0
	VB	N. Reef	10	NF	0	0	0	N/A	N/A	1,085	923	− ≈ 15	0	0
	VB	Nickle Reef	100	NF	5.6	2.4	− ≈ 57.1	25.9	83.2	1,918	1,879	− ≈ 2	0	0
	VB	Rabbit	15	NF	0	0	0	N/A	N/A	1,174	997	− ≈ 15	0	0
	VB	Sally Shoals	5	NF	0	0	0	N/A	N/A	1,620	1,146	− ≈ 29.3	0	0
	LC	LC 2009 CP	295	NF	3.6	1.5	− ≈ 57.1	90.3	108	4,550	4,894	+ ≈ 7.6	0	0
	LC	Big Washout	295	NF	0.6	0.2	− ≈ 58.4	68.7	92.8	1,802	1,659	− ≈ 8	0	0
	LC	Chenier Reef	10	NF	18.4	7.8	− ≈ 57.8	42.5	86	9,170	9,706	+ ≈ 5.8	0	0
	LC	Lambert's 2015 CP	20	NF	1.2	0.5	− ≈ 57	88.7	107	7,530	6,919	− ≈ 8.1	0	0
	LC	Lamberts Reef	240	NF	0.8	0.3	− ≈ 56.5	113.2	126	562	580	+ ≈ 3.2	0	0
	LC	Little Washout	295	NF	4.2	1.8	− ≈ 57.1	80.8	103	1,458	1,713	+ ≈ 17.5	0	0
	LC	Mid Lake	295	NF	1.2	0.5	− ≈ 56.5	132.8	146	974	1,182	+ ≈ 21.4	0	0
	LC	N.E. Rabbit	366	NF	2.2	0.9	− ≈ 57	72.9	99.7	382	496	+ ≈ 29.7	0	0
	LC	N.W. Rabbit Is.	755	NF	9.4	4	− ≈ 57.1	84.7	106	172	1,229	+ ≈ 614.3	0	0
	LC	S.E. Rabbit	366	NF	4.6	2	− ≈ 57	92.2	112	548	1,061	+ ≈ 93.6	0	0
	LC	W. Cove Transplant	366	NF	0.6	0.3	− ≈ 56.5	103.7	117	326	377	+ ≈ 15.7	0	0
	LC	W. Rabbit	755	NF	20.8	8.9	− ≈ 57.2	85.8	106	508	2,713	+ ≈ 434.1	0	0
	LC	W. Cove 2015 CP	25	NF	15.2	6.3	− ≈ 58.2	64.2	93	3,582	4,195	+ ≈ 17.1	0	0
	LC	W. Cove Central	755	NF	7	3	− ≈ 56.7	86.7	103	198	857	+ ≈ 333	0	0