Oyster Lease Damage Evaluation Board
Uniform Evaluation Methods

I. Introduction

The purpose of these general oyster lease damage "Uniform Evaluation Methods" is to assist the Oyster Lease Damage Evaluation Board (Board) in the consistent estimation of anticipated damages and associated initial damage deposit, as well as the assessment of final damages and associated payment to leaseholders. These Methods are intended to provide general guidance and the Board will address case-by-case differences as they arise.

Prior to the estimation of anticipated and final damages provided by the application of these Methods, the Board will also consider historical information provided by the Leaseholder regarding the Leaseholder's management and operation of the subject lease. Leaseholder records shall provide essential contextual information which will guide the Board in its interpretation of the data provided from the biological surveys. Additionally, the Board will also consider other relevant information pertinent to cases before the Board, such as the occurrence of storm events or other acts of God, during the arbitration period which may affect the results of the biological surveys.

II. Compensation for damages to oyster supporting bottom substrate

A. Cultch Currency Table

The Cultch Currency Matrix (CCM), Table 1, provides an estimate of oyster supportive habitat based on two primary factors: salinity regime and substrate type. The Matrix defines the following six bottom substrate categories (and quantifies the relative value of those substrate types in providing oyster supportive habitat, expressed as a percentage): Reef (100% supportive), Shell/Cultch (80% supportive), Firm Mud (10-50 % supportive), Buried Shell (1 % supportive), Soft Mud (1 % supportive) and Sand (1 % supportive). The supportive value of Firm Mud ranges from 10% to 50%, depending on the historical use of this substrate type in the Leaseholder's operations (e.g., use as a bedding area) The specific value within this range will be determined by the Board based on information obtained from the biological surveys and Leaseholder records. The Matrix also defines five salinity regimes (and quantifies the relative value of those regimes in supporting oyster production, expressed as a percentage): Landward Zone (10%), Dry Zone (75%), Wet/Dry Zone (100%), Wet Zone (80%), and Gulfward Zone (50%). These "oyster resource zones" are based on the Oyster Resource Map (see Figure 1) developed by Melancon et al, 1984. The resulting two-way table can be used to estimate the oyster supportive "value" of a lease based upon the substrate types and salinity regime. The CCM also defines the rates of cultch application which would be required to replicate the surficial oyster supportive habitat of those six substrate types within each of the five salinity zones.

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Table 1 shows CCM values for the different substrate types and salinity regimes with corresponding cultch application rates

Table 1 *Matrix Values and Corresponding "Cultch Currencies"

Substrate type	Substrate Value (%)	Cultch Rate (cy/a)	-- -- -- -- -- Oyster Resource Zones -- -- -- -- --									
			Landward (10%)		Dry (75%)		Wet/Dry (100%)		Wet (80%)		Gulf (50%)	
			Combined value (%)	Cultch Rate (cy/a)	Combined value (%)	Cultch Rate (cy/a)	Combined value (%)	Cultch Rate (cy/a)	Combined value (%)	Cultch Rate (cy/a)	Combined value (%)	Cultch Rate (cy/a)
Reef	100	403	10	40.3	75	302.25	100	403	80	322.4	50	201.5
Cultch	80	322.4	8	32.24	60	241.8	80	322.4	64	257.92	40	161.2
Firm Mud	50	201.5	5	20.15	37.5	151.13	50	201.5	40	161.2	25	100.75
(10-50%)	10	40.3	1	4.03	7.5	30.23	10	40.3	8	32.24	5	20.15
Buried shell	1	4.03	0.1	0.4	0.75	3.02	1	4.03	0.8	3.22	0.5	2.02
Sand	1	4.03	0.1	0.4	0.75	3.02	1	4.03	0.8	3.22	0.5	2.02
Soft Mud	1	4.03	0.1	0.4	0.75	3.02	1	4.03	0.8	3.22	0.5	2.02

*Note: The "matrix" values or percentages are modified from the Oyster Bottom Evaluation Methodology Report (Ray 1996).

B. Procedure

1. Overview

Using information from the initial and final biological surveys (conducted in accordance with the General Guidelines for Conducting Oyster Lease Biological Surveys), the Board will determine how many acres of each substrate type 1) is anticipated to be damaged as a result of a proposed mineral activity, and 2) is actually damaged subsequent to the completion of the mineral activity. Based on the CCM, including the subject lease's location within the appropriate Oyster Resource Zone, the volume (cy) of cultch material needed to compensate for the loss of these oyster supportive substrates will be determined. The compensation for actual damages to oyster supportive substrate will be the cost of purchasing and placing that quantity of cultch.

2. Initial damage prediction

The initial biological survey will produce a map showing the pre-project configuration and aerial extent (in acres) of the bottom substrate types located on that portion of the lease which the Board determines may be impacted by the proposed activity. The anticipated impacted area will be based on the description of the proposed mineral activity; however, the Board may, at its discretion, consider additional information which may result in the anticipated "impact area" of the mineral activity exceeding the actual "footprint" of the proposed activity. Using the cultch application rates defined in the CCM, the total cubic yards of cultch which would be required to compensate for anticipated damages to surficial habitat will be calculated. In establishing the oyster supporting

bottom substrate component of the initial damage deposit, the Board will determine the funds which would be required to purchase and place that quantity of cultch material, based upon current market price and location of the lease in question.

The formula for the initial estimation of substrate damage is:

Predicted Substrate Damage = (the total area of each of the substrate types anticipated to be damaged * cultch application rate for those substrate types)* cost/cy of purchase and placement of cultch material, or

Predicted Substrate Damage = (Substrate ^{1} * Cultch ^{1}) + (Substrate ^{2} * Cultch ^{2})+ (Substrate ^{n} * Cultch ^{n}) * cost/cy of purchase and placement of cultch material, where Substrate ^{1} is the acreage of substrate type 1 anticipated to be impacted, Cultch ^{1} is the cultch application rate for substrate type 1; Substrate ^{2} is the acreage of substrate type 2 anticipated to be impacted, Cultch ^{2} is the cultch application rate for substrate type 2.

3. Final Damage Assessment

Based on the General Guidelines for Conducting Oyster Lease Biological Surveys, a final, post-project assessment of bottom substrate types will be conducted. The pre- and post-construction bottom substrate maps will be compared to identify and quantify the area and bottom substrate types actually damaged by the development activity. The determination of final substrate damages will be based on the actual losses of substrate acreage. The Final Substrate Damage value derived from the following formula is meant to be an estimated value, which the Board will consider along with any other information deemed appropriate by the Board, including the biologist's information regarding the physical environment of the lease; documentation provided by the Leaseholder regarding the operation of the lease; any investments made to the lease by the Leaseholder; and other pertinent information.

The formula for estimating Final Substrate Damages is based on determining the acreage of damaged substrates by subtracting the final, post-construction acreage of the various substrate types from the initial, pre-construction acreage of those substrate types (i.e., acres of damaged substrate type 1 = pre-construction acreage of substrate type 1 - post-construction acreage of substrate type 1). The formula for estimating Final Substrate Damage is:

Final Substrate Damages = the sum of the differences between pre- and post- construction substrates * cultch application rate for those substrate types * $/cy for purchase and placement of cultch material on lease, or

Final Substrate Damages = {[(Substrate $^{1}_{initial}$ -Substrate $^{1}_{final}$) * Cultch ^{1}] + [(Substrate $^{2}_{initial}$ - Substrate $^{2}_{final}$)* Cultch ^{2}] +[(Substrate $^{n}_{initial}$ - Substrate $^{n}_{final}$) * Cultch

^{n}]}* $/cy for purchase and placement of cultch material on lease; where Substrate $^{1}{}_{initial}$ is the total pre-construction acreage of substrate type 1, Substrate $^{1}{}_{final}$ is the total, post-construction acreage of substrate type 1, Cultch ^{1} is the cultch application rate for Substrate type 1, Substrate $^{2}{}_{initial}$ is the total pre-construction acreage of substrate type 2, Substrate $^{2}{}_{final}$ is the total, post-construction acreage of substrate type 2, Cultch ^{2} is the cultch application rate for Substrate type 2.

III. Compensation for damages to living oyster resources

A. Procedure

1. Overview

Using information from the initial and final biological surveys (conducted in accordance with the General Guidelines for Conducting Oyster Lease Biological Surveys), the Board will determine the standing crop of the three size classes of living oyster resources present on each substrate type. Based on that information, coupled with the current market rate of marketable oysters and the mortality rates of non-marketable, immature oysters, the Board will 1) estimate the potential losses of living oyster resources anticipated to result from the proposed mineral activity, and 2) determine the actual losses of living oyster resources subsequent to the completion of the mineral activity.

The Board has classified living oyster resources into three size classes 1) marketable oysters which are those longer than three inches, 2) seed oysters, which are between three inches and two inches, and 3) spat, which are those shorter than two inches. This classification scheme partitions the components of living oyster resources into actual and potential harvestable crop by year groups. For the purposes of the Board, a count of 190 oysters is equal to one sack for all size classes. With proper discounting based upon standard mortality rates for immature oysters, the flat rate of 190 oysters/sack provides an estimate of the potential market crop for each of the three years immediately following the biological survey.

2.Initial Damage Prediction

The economic value of that portion of the standing crop which the Board determines may be damaged by the mineral activity will be estimated as follows. Harvestable oysters (i.e., the current year market crop) will be valued at the current market price/sack less the harvest cost (it is recommended to use $5.00/sack as the current harvest cost). The future harvest potential of the standing crop of the two immature classes (following two years potential market crop) will be determined by discounting the immature oysters at the appropriate mortality rate (90% mortality for spat and 50% for seed). The value of those future harvestable oysters will be determined in the same manner as for currently harvestable oysters (e.g., using the current market price and the current estimated harvest cost).

Based upon information obtained during the initial biological survey, the Board will estimate the standing crop of living oyster resources present on that portion of the lease anticipated to be damaged. The potential losses of those living oyster resources will be estimated based on the area of the lease which the Board determines may be impacted by the proposed mineral activity.

The formula for estimating the potential economic value of the standing crop is:

Predicted Standing Crop Damage = ($ value of marketable oysters) + ($ value of the production potential of existing seed oysters) + ($ value of the production potential of existing spat), where:

$ value of marketable oysters = [(marketable standing crop, sack/acre) * (acres of oyster growing substrate potentially damaged) * (cost/sack of marketable oysters-harvest cost/sack)],

$ value of the production potential of existing seed oysters = [(seed oyster standing crop, sack/acre - 50% of the seed oyster standing crop) * (acres of oyster growing substrate potentially damaged) * (cost/sack of marketable oysters-harvest cost/sack)], and

$ value of the production potential of existing spat = [(spat oyster standing crop, sack/acre - 90% of the spat standing crop) * (acres of oyster growing substrate potentially damaged) * (cost/sack of marketable oysters-harvest cost/sack)].

3. Final Damage Assessment

The final biological survey will identify changes in standing crop densities resulting from the mineral activity. The compensation for actual damages to living oyster resources will be based upon actual losses of the standing crop, or the differences between pre- and post- project standing crops beyond that which may have been harvested in the interim or damaged by acts of God. The economic value of those actual losses will be determined in accordance with the method described above in the Initial Damage Prediction section. The value derived from the following formula is meant to be an estimated value, which the Board will consider along with the biologist's information regarding the physical environment of the lease and oyster mortality when determining final damages to living oyster resources.

The formula for estimating the final damages to the standing crop is:

Final Standing Crop Damage = ($ value of lost marketable oysters) + ($ value of the production potential of lost seed oysters) + ($ value of the production potential of lost spat), where:

$ value of lost marketable oysters = [(marketable standing crop, sack/acre $_{initial}$ - marketable standing crop, sack/acre $_{final}$) * (Substrate ^{n} $_{initial}$ - Substrate ^{n} $_{final}$) * (cost/sack of marketable oysters-harvest cost/sack)],

$ value of the production potential of lost seed oysters =[(seed standing crop, sack/acre $_{initial}$ - seed standing crop, sack/acre $_{final}$) - (50% of lost seed oysters) * (Substrate ^{n} $_{initial}$ - Substrate ^{n} $_{final}$) * (cost/sack of marketable oysters-harvest cost/sack)], and

$ value of the production potential of lost spat =[(spat standing crop/acre $_{initial}$ - spat standing crop/acre $_{final}$) - (90% of lost spat oysters) * (Substrate ^{n} $_{initial}$ -Substrate ^{n} $_{final}$) * (cost/sack of marketable oysters-harvest cost/sack)].

IV. Determination of total initial damage deposit and total compensation for final damages

The initial bond deposit for estimated damages is the sum of the estimated cost of replicating the surficial oyster supporting substrates anticipated to be damaged by the proposed activity, and the potential economic value of the existing and future production potential of the living oyster resources existing on the lease which may be impacted by the proposed activity. Note that the Board shall also consider additional pertinent information as described in Section I., Introduction.

The formula for estimating the initial bond deposit is:

Initial Bond Deposit = Predicted Substrate Damage + Predicted Standing Crop Damage

The final compensation to the Leaseholder is estimated as the sum of the dollar value of 1) the cost of purchasing and placing the quantity of cultch required to replicate the oyster supportive characteristics of substrates actually damaged, and 2) the economic value of the a) actual losses in harvestable oyster resources, and b) the loss of harvestable oysters which would have potentially been produced by the standing crop of seed and spat. Note that the Board shall also consider additional pertinent information as described in Section I., Introduction.

The formula for total compensation to the leaseholder is:

Final Leaseholder Compensation = Final Substrate Damages + Final Standing Crop Damage

This compensation figure is a guideline value that should give the Board a basis from which to determine final compensation. The amount derived from these formulas may not be the final compensation because other factors, such as leaseholder records and other pertinent information as described in Section I., Introduction, will be considered by the Board on a case by case basis.

References

Melancon, E., Jr., and Richard Condrey. 1992. Economics of a Louisiana oyster seed bedding fishery and the influence of lease yield on expenses to operate. Journal of Shellfish Research. 11: 1, pp 143-147.

Melancon, E., Jr., T. Soniat, V. Cheramie, M. Lagarde, R. Dugas and J. Barras. 1994. The Oyster Resource Zones within the Barataria and Terrebonne estuaries. Publication No. 15, Barataria-Terrebonne National Estuary Program.

Ray, Sammy M. 1996. Oyster Bottom Evaluation Methodology Report. Report to the Louisiana Department of Natural Resources, Baton Rouge, La. 20 pp.

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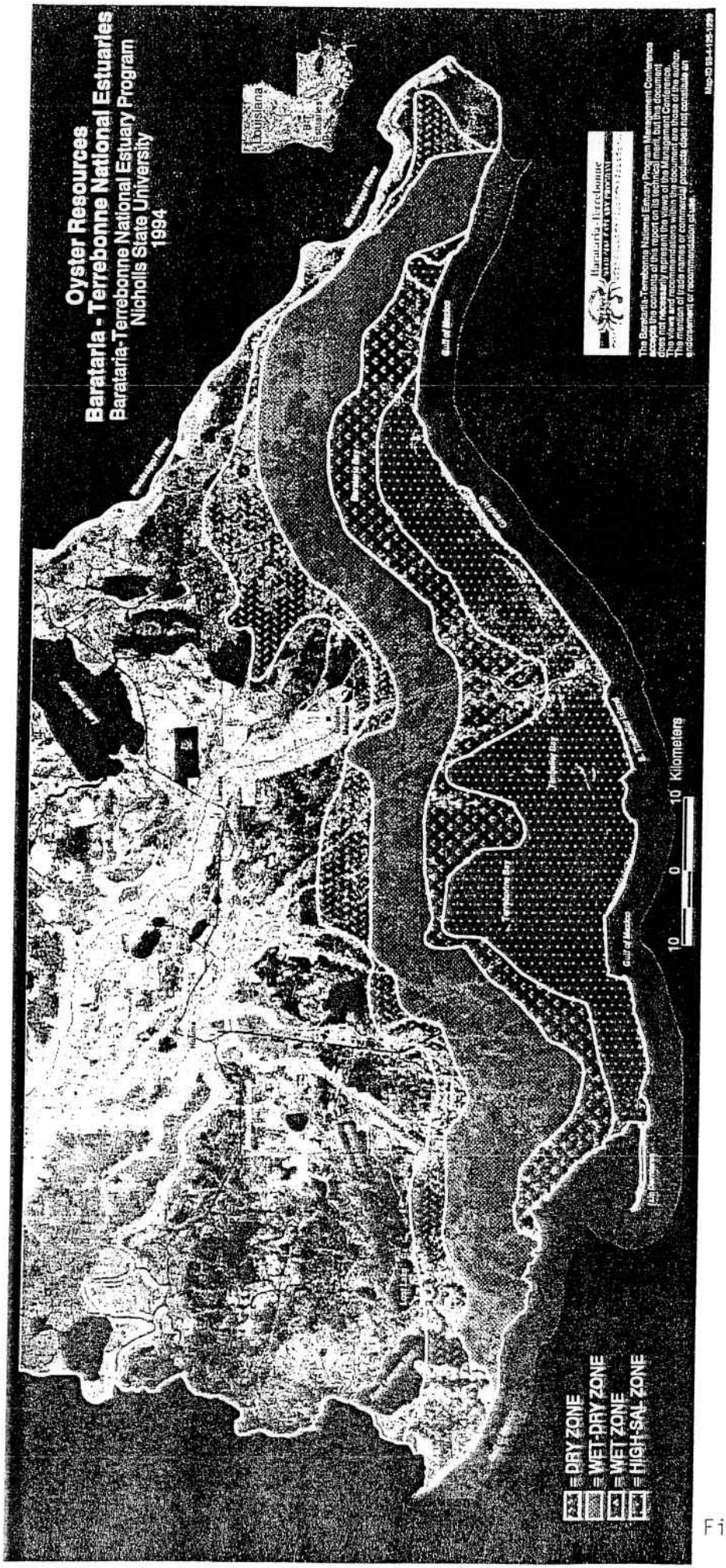

Fig.1 Oyster Resources Map