

GPMS Scoring Algorithm Comparison (Alpha Version 2.4)

NOTE: Key changes in documentation from Alpha Version 2.0 are in RED as of 20210303

Overview:

This is a working document. Its purpose is to provide an initial data model capturing the relationships being developed as part of the new EAS system.

This latest version, per team discussions, incorporated three previously developed components and introduces two new components.

The previously developed components are: The Performance Assessment Matrix (PAM), Performance Measure Weighting (PM Weighting) System, and the working Grantee Scorecard.

The two new components are: A variable QI to PM aggregation relationship and the incorporation of Content Areas (CAs)

The revised EAS system has four components:

1) Quality Markers

Quality Markers (QMs) are the lowest (most elemental) item being reviewed within the proposed EAS system.

Quality Markers have the following properties within the proposed EAS system.

- a) Each is intended to capture a distinct item.
- b) Each is measured in terms of either its existence or upon a quality scale.
- c) Each is either linked to a specific standard/requirement for grantee compliance OR a specific performance/quality concept

Note 1: For purposes of illustration, two types of QMs are included in this working document. These are distinguished by how they are measured (see Notes 2 and 3)

Note 2: The first type of QM included in this example measures existence. QMs measuring existence result in a boolean (1=Yes; 0=No) outcome indicating that the grantee has the system, qualification, measurement, etc. in place or

Note 2: The second type of QM included reflects items measured on a scale. For simplicity, we currently assume that rating scale reflects three "states": 1=Fails to Meet Requirements or Expectations, 2=Meets Requirements or Expec

2) Quality Indicators

Quality Indicators are intended to key specific concepts related to grantee quality and performance. Quality Indicators (QIs) are an aggregation of one or more Quality Markers (QMs). Unlike QMs, QIs do not need to be

- a) Each QI is composed of multiple QMs
- b) A QI's final value is a function of its component QMs
- c) There is a many to many relationship between QMs and QIs. In other words, a given QMs may contribute to multiple QIs. *It is this potential "sharing of QMs" that mean that QIs may not be distinct from one another.*
- d) For a QI, its contributing QMs has different importance or 'layers of priority'. For instance, some QMs may be required (Must Haves) and others just preferred (Should Haves).
- e) Quality Indicators are rated on a 5-point scale with 1 indicating lowest performance and/or quality and 5 being highest.
- f) The 5-point scale used by QIs is an ordinal and not cardinal scale. It is intended to clearly capture the dimensions of Compliance and Quality.

The values represent relative ranks tied to specific definitions, but do not represent points on a continuum

Note 1: The 5-point PM Scale is proposed and assumed here to illustrate how Quality Markers can roll into Quality Indicators which roll into Performance Measures.

Note 2: The sheet, QI_Coding_Range, provides a proposed interpretation of this 5-point QI scale along with how a score can be derived by first combining the two different types of Quality Markers and then combining the score of ec

Note 3: Additional "types" of Quality Markers can be included in future versions. To do so, two important things are needed: 1) A clear definition of how that new type is measured, and 2) a clear definition of how the QMs of the new

Note 4: In this version, all QMs contribute to their QIs in a similar way. This can be relaxed in later versions (see how QIs aggregate to Performance Measures as a conceptual example)

3) Performance Measures

Performance Measures (PMs) are intended to broader areas of grantee quality and performance. They can exist with specific Content Areas or be applied system-wide. They have the following properties:

- a) Each PM is composed of multiple Quality Indicators (QIs)
- b) Each PM is intended to measure a different dimension of performance and/or quality.
- c) Each PM's value is a function of its components QIs
- d) QIs do not need to be exclusive to a PM. There can be a many-to-many relationship between QIs and PMs. In other words, a given QI can contribute to multiple PMs.
- e) PMs are rated on a 5-point scale with 1 being lowest and 5 being highest. However, this is an ordinal and not cardinal scale. The values represent relative ranks tied to specific definitions, but do not represent points on a continuum
- f) A given QI can contribute differently to different PMs. For example, an 'electronic invoicing system' QI can be a relatively important component of a performance measure regarding fiscal health, but of relatively low importance relativ

Note 1: This 5 point scale is based upon the prior 5-point scale used in previous FA reviews

Note 2: The sheet, PM_Coding_Range, provides a proposed interpretation of this scale incorporated the proposed changes to the EAS and addition of QMs.

4) Content Areas

Content Areas (CAs) reflect important, and targeted, dimensions of grantee performance. They are comprised of one or more Performance Measures (PMs), and have the following properties:

- a) Each CA is intended to reflect performance and/or quality across a specific broad dimension. *NOTE: In this sense, "System-Wide" performance can be as a unique content area.*
- b) Each CA is composed of one or more PMs.
- c) Each component PM's contribution to a given CA is defined by the assessment approach selected. *NOTE: There are currently two proposed assessment approaches: The PAM and PM Weighting*
- d) While CAs are intended to be unique, they do not need exclusive of one another. In other words, a given PM could contribute to multiple content areas.

Organization of Spreadsheet:

This spreadsheet is organized in the following way. The first several sheets describe the data model, the proposed coding and aggregation approaches for Quality Indicators, Quality Markers, Performance Measures, and Content Areas, respectively. Following these documentation sheets, an initial working model is presented. This model captures the relationship between QIs, QMs, PMs, and CAs. This current version contains a set of hypothetical QIs and QMs. These aggregate to a group of 25 PMs. This set of PMs contains the 23 PMs reviewed and ranked in earlier work as well as two additional "System PMs". The addition of the System PMs is intended to capture design consideration noted during the last team discussion. The Content Areas are the six already established and assessed during FA1/2 reviews and an addition "Systems" content area, which-like System PMs-is intended to capture design considerations noted during previous team meetings. As the evolving Alpha Version illustrations, our framework can be quickly adopted to incorporate actual measures to support simulation and stress testing of functioning.

The Workbook contains the following sheets:

Data_Model: This sheet graphically describes the data model including lists, references, and crosswalks (proposed queries).

QI_Coding_Range: This sheet describing how values for QIs can be derived from its components QMs

PM_Coding_Range: This sheet describes how values for the PMs can be mapped from its component QIs

Overview_PAM: This sheet describes the Performance Assessment Matrix (PAM) approach to scoring.

Overview_PM_Weighting: This sheet describes the weighting approach to scoring.

Grantee Comparison ScoreCard: This sheet, which is from prior distributed versions, presents an initial GPMS scorecard and compares the PAM and PM Weighting GPMS approaches

TBL_QM_MasterList: This sheet contains an exhaustive list of all Quality Markers their scale, and their values. *There are currently 100 example Quality Markers*

TBL_QI_MasterList: This sheet contains an exhaustive list of all Quality Indicators and computes their value (5-point scale) from component QMs. *There are currently 50 Quality Indicators.*

TBL_PM_MasterList: This sheet contains an exhaustive list of all Performance Measures and computes their values (5-point scale) from component QMs. *There are currently 25 Performance Measures.*

TBL_CA_MasterList: This sheet contains an exhaustive list of all Content Areas

CR1_QM_QI: This crosswalk table captures the many to many relationship between QMs and component QIs. *There are currently 500 QI:QM links.*

CR_PM_QI: This crosswork captures the many to many relationship between PMs and component QIs. It also captures information concerning how QIs contributed to PMs. *There are currently 250 QI:PM links.*

CR_CA_PM: This crosswork captures the many to many relationship between CAs and component PMs.

ReferenceLists: This sheet contains several lists to ensure referential integrity across the working model.

PAM_DataInputs: This sheet, reproduced from previous distributions, contains input data to calculate PAM scores on the Grantee Comparison ScoreCard.

Scoring_DataInputs: This sheet, reproduced from previous distributions, contains input data to calculate PM Weighting scores on the Grantee Comparison ScoreCard.

SimulatedData: This sheet contains several sets of simulated data for the QM values. *The different scenarios can be selected on the Grantee Comparison ScoreCard sheet.*

Appdx_PermutationsOfQMScores: This appendix sheet illustrates all possible permutations from the provided QM scoring approach discussed in the PM_Coding_Range sheet.

GPMS Data Model

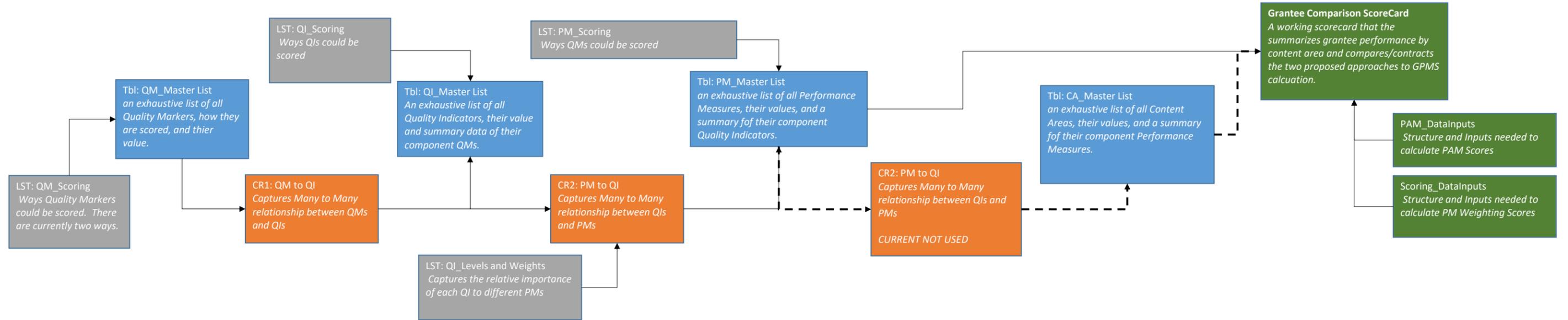
Overview:

This sheet presents a graphic overview of the proposed GPMS data model that has been implemented in this workbook. Being Excel-based, this alpha version makes extensive use of internal Excel functions such as Vlookup, Sumifs, and other reference functions. These will likely require specific queries or front-end coding in the IT&AMS system.

A design consideration of a future IT&AMS system is an administration interface that focuses upon the QM:QI, QI:PM, and PM:CA relationships currently captures in the CRX_YY_ZZ tabs.

A design consideration of a future IT&AMS system is a "simulator"/"scenario" interface. As all core data driving the system is captured at the QM level, this interface could support 'scenarios' in the form of 'proposed Qis', 'proposed PMs', and alternative aggregation rules.

Data Model:



GPMS Performance Assessment Matrix (PAM) Scoring

Overview:

This document presents a simulated example of how the PAM, originally presented by Dr. Fiene, could be presented in a Grantee Scorecard Approach similar to the GPMS Scoring Calculator

The PAM is organized around the following principles

- The existing performance measures in the FA 1 and 2 protocols can be grouped in tiers of severity and/or importance.
 - Note 1: This initial version proposes three tiers of performance*
 - Note 2: Each PM's tier is determined by their median rating from our survey of experts.*
 - Note 3: These surveyed ranking are the same data used to set the weights in the GPMS performance calculator.*
- Performance measure can be grouped in tiers according to the scope/prevalence of findings (i.e. citations pertaining to standards under a performance measure)
 - Note 1: The logic behind this is that PMs with a greater number of findings are better able to distinguish levels of performance.*
 - Note 2: In this illustration, prevalence refers to the total number of findings across all grantees. Thus, this introduces a level of relative performance to the PAM.*
- Grantee PM Score that rated on a scale of 1-5.

Combined, these three principles create of 3 dimensional "cube" of potential performance values for each PM for each grantee. These dimensions are

In the original presentation, these were illustrated as a 3x3x3 cube in the following way:

- The "Importance Tier" of the PM as determined by the survey data was presented as three rows: Top, Mid, and Low PMS
- The "Prevalence Tier" as determined by the number of total findings across all grantees was presented as three columns: Often, Sometimes, and Rarely.
 - NOTE1: These two dimensions are 'universal' across all grantees in that the PM rankings and prevalence across all grantees of citations is near constant for any particular grantee.*
- There were three possible values for a grantee's score for that PM in this example: Low, Medium, and High.
 - NOTE2: In tandem, the Importance and Prevalence dimensions place each PM on a 3x3 grid and determine how many points it can contribute.*
For instance, a "Top PM" that is "Often" cited can contribute up to 9 points if the grantee scores high and deduct 9 is that grantee scores low on that PM.
 - NOTE3: The grantee's PM score determines the specific value (from three possible)*
For instance, a high PM score contributes 9, a low deducts 9 and a medium contributes 0.

The values within the PAM reflect the priority given to the three dimensions. This is illustrated in the two tables below.

The table on the left gives priority to the Severity Dimension and has the following ordering: Severity, Prevalence and PM Score. Thus, the top row (highest severity) has the highest values followed by the second and so on.

The table on the right gives priority to the Prevalence Dimension and has the following ordings: Prevalence, Severity, and PM Score. In this tables, the first column has the highest values followed by the second and so on.

On the Grantee Scorecare comparison sheet, the impact of these two orderings can be seen by changing the priority pulldown.

		Prevalence (Often, Sometimes, and Rarely as columns)			Grantee PM Score (Selection of specific value within PM's cell)
Severity or Importance (Top, Mid and Low as rows)		Often (+/-)	Sometimes (+/-)	Rarely (+/-)	
Top PMs		-9,0,+9	-8,0,+8	-7,0,+7	<i>Low Score: Negative Value in Cell</i>
Mid PMs		-6,0,+6	-5,0,+5	-4,0,+4	<i>Medium Score: Zero Value in Cell</i>
Low PMs		-3,0,+3	-2,0,+2	-1,0,+1	<i>High Score: Highest Value in Cell</i>

		Prevalence (Often, Sometimes, and Rarely as columns)			Grantee PM Score (Selection of specific value within PM's cell)
Severity or Importance (Top, Mid and Low as rows)		Often (+/-)	Sometimes (+/-)	Rarely (+/-)	
Top PMs		-9,0,+9	-6,0,+6	-3,0,+3	<i>Low Score: Negative Value in Cell</i>
Mid PMs		-8,0,+8	-5,0,+5	-2,0,+2	<i>Medium Score: Zero Value in Cell</i>
Low PMs		-7,0,+7	-4,0,+4	-1,0,+1	<i>High Score: Highest Value in Cell</i>

Methodology applied in this document for Calculating a PAM score

This numerical example applies the approach discussed above and limits calculation to only the use of PM values. These values are contained in Table 1 of the PAM Data Inputs page.

To facilitate comparison between the PAM and the PM_Weighting approach the same QM:QI relationships and QI:PM relationships are used.

A three tier structure for the Severity/Importance dimension is used. Each PM's tier on this dimension is determined by their tercile of the median PM ranks. The highest ranked third is placed in the top PMs row.

The middle third in the Mid PMs row, and the lowest third in the Low PMs row. These are listed in the Severity Category column of Table 2.

A three tier structure is also used for the Prevalence dimension. To populate this dimension, a randomly generated number of findings across all grantees (from 0-100) were created.

Using this value, PMs were placed-by tercile-into the Often, Sometimes, or Rarely column.

The Grantee PM score dimension is expanded to five levels consistent with how PM scores will be generated in the real world.

Values for the two "middling" categories of 2 and 4 were set to the mid-point between the Low and Medium AND Medium and High values, respectively.

These final values are contained within Table 1 on the PAM Data Inputs sheet.

Grantee PAM Scorecard

This sheet illustrates, in a manner similar to the GPMS Scoring Calculator, how the PAM would capture and report grantee performance across different content areas and overall.

One is able to see a variety of potential grantee scores by changing the sample grantee data used. This is done by the drop down menu in cell d5. The baseline is setting all PMs to 3 and a zero PAM score. Scores are updated and presented along with the maximum and minimum possible for each PM grouped by content area.

At the top, the overall PAM score and content area specific scores are presented. These are also illustrated in a Red-Yellow-Green Stoplight graph. In that graph, Red is low performance, Yellow medium performance, and Green top performance.

Finally, to illustrate how sensitive the range of potential PAM scores (i.e. column determination through the Prevalence Matrix) are to the simulated number of findings, one can toggle from the baseline number of findings to a new random draw by using the pulldown and selecting 'random' in cell D7. Then, each time F9 is pressed a new random draw is pulled, the PAM recalibrated, and scores updated.

Simulation/QM Information	
Quality Marker Simulation	Mid_Score
Quality Indicator Weights	Equal
Baseline or Rand Findings Impacts PAM	Baseline
Importance or Prevalence Impacts PAM	Importance
Baseline or Rand CA %s Impacts PM Weights	Baseline

Content Area	# of PMs	PAM			PM Weighting											
		Grantee	Max	Min	Average PM Wt	Content Area %	Weighted PM Scores	% of Wgtd Sum	Scaled to CA %	% of Final Score	% of Possible	Max Wtd PM Scores	Max Scaled to CA %	% of Final Score	Max Scaled to CA %	% of Final Score
Overall Rating	22	59.5	101	-99			26.24	100.0%	26.24	100.0%	79.6%	32.96	32.96	100%	32.96	100%
ECD PMs	4	5.00	10.00	-10.00	24%	20%	3.79	14.4%	5.25	20.0%	79.6%	4.74	6.59	20%	6.59	20%
Program Design PMs	4	7.50	15.00	-13.00	70%	15%	12.67	48.3%	3.94	15.0%	79.6%	14.02	4.94	15%	4.94	15%
Family and Community Engagement PMs	3	10.00	20.00	-20.00	19%	15%	2.29	8.7%	3.94	15.0%	79.6%	2.86	4.94	15%	4.94	15%
Health and Safety PMs	5	13.50	27.00	-27.00	19%	15%	3.08	11.7%	3.94	15.0%	79.6%	4.81	4.94	15%	4.94	15%
Fiscal	4	5.50	11.00	-11.00	20%	15%	2.45	9.3%	3.94	15.0%	79.6%	4.09	4.94	15%	4.94	15%
ERSEA PMs	2	9.00	18.00	-18.00	25%	20%	1.96	7.5%	5.25	20.0%	79.6%	2.46	6.59	20%	6.59	20%

		PAM			PM Weighting		
Early Childhood Development		Score	PAM Score	Max	Min	Score	Weight
PM #	Performance Measure		5.00	10.00	-10.00	3.79	0.20
ECD N.1	Center-based and family child care programs provide responsive and effective teaching practices and an organized learning environment that promote children's learning and school readiness.	4	2.00	4.00	-4.00	4.00	0.36
ECD N.2	The program implements developmentally appropriate research-based early childhood curricula and conducts culturally and linguistically appropriate screenings and assessments.	4	0.50	1.00	-1.00	4.00	0.29
ECD N.3	The program implements a program-wide, strategic approach to school readiness that is informed by its local context and data, and embeds school readiness into the program's mission.	4	2.00	4.00	-4.00	4.00	0.09
ECD N.4	Home-based programs provide home visits and group socialization activities that promote secure parent-child relationships and help parents provide high-quality early learning experiences for their children.	4	0.50	1.00	-1.00	4.00	0.21

		PAM			PM Weighting		
Program Design		Score	PAM Score	Max	Min	Score	Weight
PM #	Performance Measure		7.50	15.00	-13.00	12.67	0.15
PMQI N.1	The grantee maintains a management structure that supports program staff in delivering high quality services to children and families to optimize individual child and family progress and achieve desired outcomes	4	2.00	4.00	-4.00	4.00	0.61
PMQI N.2	The grantee monitors and uses data to understand program performance and progress, and to take action based on those data to ensure quality services, achieve program goals and improve child and family outcomes	4	0.50	1.00	-1.00	4.00	1.00
PMQI N.3	(NEW) The grantee recognizes and is responsive to current and changing needs of the community it serves, including the unique needs of the program's minority and more vulnerable populations	4	3.00	6.00	-6.00	4.00	0.99
PMQI N.4	The grantee maintains a formal structure of program governance that is actively engaged and provides data-informed oversight of the program's design, implementation and continuous improvement efforts to ensure quality and responsive services are provided	4	1.00	2.00	-2.00	4.00	0.34
PMQI N.5	The grantee's policy council uses relevant program data to support its active engagement in the direction of the program, including program design and planning of goals and objectives	4	1.00	2.00	-2.00	4.00	0.56

		PAM			PM Weighting		
Family and Community Engagement		Score	PAM Score	Max	Min	Score	Weight
PM #	Performance Measure		10.00	20.00	-20.00	2.29	0.15
FCE N.1	The grantee implements an organizational approach to engaging families, and their Family and Community Engagement Services that is highly responsive, prioritizes family and community needs, and ensures staff have the capacity and support to do their job.	4	3.50	7.00	-7.00	4.00	0.25
FCE N.2	The grantee implements a family partnership process that is founded in mutual respect and trusting relationships and supports families in continuously addressing their interests, needs and desired goals.	4	2.50	5.00	-5.00	4.00	0.12
FCE N.3	The grantee supports parents and families in developing parent-child relationships that nurture their child's development.	4	4.00	8.00	-8.00	4.00	0.20

		PAM			PM Weighting		
Health & Safety		Score	PAM Score	Max	Min	Score	Weight
PM #	Performance Measure		13.50	27.00	-27.00	3.08	0.15
HEA N.1	The grantee understands and meets children's health-related needs and establishes a strategic program approach that fosters child, family and staff health, and the promotion of life-long healthy habits. (Results/Outcomes)	4	4.00	8.00	-8.00	4.00	0.22
HEA N.2	The grantee implements a program-wide strategic program approach that promotes children, staff and families' mental health and overall social and emotional well-being. (Results/Outcomes)	4	4.00	8.00	-8.00	4.00	0.16
HEA N.3	The grantee establishes a strategic program approach of health and safety and maintains healthy and safe indoor and outdoor environments for children, staff and families. (Results/Outcomes)	4	1.50	3.00	-3.00	4.00	0.26
HEA N.4	For grantees serving expecting families, the grantee facilitates pregnant women's access to health care and promotes their family's health and emotional wellbeing. (Results/Outcomes)	4	4.00	8.00	-8.00	4.00	0.13

		PAM			PM Weighting		
Fiscal		Score	PAM Score	Max	Min	Score	Weight
PM #	Performance Measure		5.50	11.00	-11.00	2.45	0.15
FIS N.1	The grantee engages in a financial planning and budgeting process that effectively utilizes Head Start funds and property to support the achievement of program goals and the delivery of quality services to children and families.	4	2.00	4.00	-4.00	4.00	0.20
FIS N.2	The grantee has established and implemented a financial management system that assures effective and compliant use of Head Start funds.	4	3.00	6.00	-6.00	4.00	0.22
FIS N.3	The grantee effectively manages all property purchased wholly or partially with Head Start funds and supports the delivery of Head Start services.	4	0.50	1.00	-1.00	4.00	0.19

		PAM			PM Weighting		
ERSEA		Score	PAM Score	Max	Min	Score	Weight
PM #	Performance Measure		9.00	18.00	-18.00	1.96	0.20
ERSEA N.1	The grantee recruits and selects the children and expectant families who would benefit the most from the program's services.	4	4.50	9.00	-9.00	4.00	0.20
ERSEA N.2	The grantee has a comprehensive system in place to ensure children and expectant families enrolled are eligible for services, and to safeguard proper use of Head Start funds.	4	4.50	9.00	-9.00	4.00	0.29

