

Proposal Reviews

#22: Expanded Prevention, Detection, and Control of Purple Loosestrife in the CALFED Bay-Delta Watershed

California Department of Food and Agriculture

Final Selection Panel Review

Initial Selection Panel Review

Research and Restoration Technical Panel Review

Delta Regional Review

San Joaquin Regional Review

Sacramento Regional Review

#1

#2

#3

External Scientific Review

#4

#5

#6

#7

Prior Performance/Next Phase Funding

#1

#2

Environmental Compliance

Budget

Final Selection Panel Review:

CALFED Bay-Delta 2002 ERP PSP Final Selection Panel Review

Proposal Number: 22

Applicant Organization: California Department of Food and Agriculture

Proposal Title: Expanded Prevention, Detection, and Control of Purple Loosestrife in the CALFED Bay-Delta Watershed

Please provide an overall evaluation rating.

Fund	
As Is	-
In Part	-
With Conditions	-
Consider as Directed Action	X
Not Recommended	-

Amount: **\$457162**

Conditions, if any, of approval (if there are no conditions, please put "None"):

None

Provide a brief explanation of your rating:

Comments were received indicating that an NPDES permit may be required. The Panel concurs that any and all necessary permits must be obtained by the applicant before actions requiring permits are undertaken. This permit requirement should be addressed in the revised proposal.

Initial Selection Panel Review:

CALFED Bay-Delta 2002 ERP PSP Initial Selection Panel Review

Proposal Number: 22

Applicant Organization: California Department of Food and Agriculture

Proposal Title: Expanded Prevention, Detection, and Control of Purple Loosestrife in the CALFED Bay-Delta Watershed

Please provide an overall evaluation rating.

Explanation of Recommendation Categories: Fund

- **As Is** (a proposal recommended for funding as proposed)
- **In Part** (a proposal for which partial funding is recommended for selected project phases or components)
- **With Conditions** (a proposal for which funds are recommended if the applicant contractually agrees to meet the specified conditions)

Consider as Directed Action in Annual Workplan (a proposal addressing a high priority action that requires some revision followed by additional review prior to being recommended for funding)

Not Recommended (a proposal not currently recommended for funding-after revision may be considered in the future)

Note on "Amount":

For proposals recommended as Fund As Is, Fund In Part or Fund With Conditions, the dollar amount is the amount recommended by the Selection Panel.

For proposals recommended as Consider as Directed Action in Annual Workplan, the dollar amount is the amount requested by the applicant(s).

Fund	
As Is	-
In Part	-
With Conditions	-
Consider as Directed Action	X
Not Recommended	-

Amount: **\$\$457,162.00**

Conditions, if any, of approval (if there are no conditions, please put "None"):

None

Provide a brief explanation of your rating:

This proposal builds on an existing effort to combat the invasion of purple loosestrife through a 3-phase approach: 1) education, 2) survey, and 3) eradication. The eradication component uses different approaches (bio-control, physical removal, herbicide). The proponents argue that they have readily met their goals set for their former funding and mention an adaptive management plan that has recently been submitted to CALFED. The proposal received several excellent ratings by external reviewers but there were some concerns over the scientific components of the proposed program. This project would provide a good opportunity to learn more about purple loosestrife relevant to its eradication e.g., For how many years are the seedbanks viable? For how many years is herbicide required? Have replicate treatments been used to document effectiveness? What are the performance measures for eradication? It is possible that these have been addressed in the adaptive management plan but it would be helpful for them to be explicitly addressed within a revised proposal. The technical panel expressed some concern that this effort should be funded by the state agency with a mandate for weed control, rather than CALFED. The Selection Panel felt this topic was appropriate for CALFED funding given the limited funding available within state agencies for these kind of efforts and the likelihood of CALFED funding making a real difference at this early stage of the invasion. Revision and resubmission for consideration as a directed action is encouraged.

Research and Restoration Technical Panel Review:

CALFED Bay-Delta 2002 ERP PSP Research and Restoration Technical Panel Review Form

Proposal Number: 22

Applicant Organization: California Department of Food and Agriculture

Proposal Title: Expanded Prevention, Detection, and Control of Purple Loosestrife in the CALFED Bay-Delta Watershed

Review:

Please provide an overall evaluation summary rating:

Superior: outstanding in all respects;

Above Average: Quality proposal, medium or high regional value, and no significant administrative concerns;

Adequate: No serious deficiencies, no significant regional impediments, and no significant administrative concerns;

Not Recommended: Serious deficiencies, significant regional impediments or significant administrative concerns.

Overall Evaluation Summary Rating	Provide a brief explanation of your summary rating
-Superior	This excellent proposal will fight the purple loosestrife invasion while it is still in its early stages while learning more about this weed and how to most effectively control it. It will provide managers at the local level the GIS map infestation areas which will be used extensively in the region. In regards to a few concerns, as noted above, the panel recommends funding and it is suggested that the PI address those concerns. Again, some of the main items which need to be addressed are: improve the scientific design including the hypotheses, replicate treatments at different locations, and document CDFA cost share items.
XAbove average	
-Adequate	
-Not recommended	

1. **Goals and Justification.** Does the proposal present a clear statement of goals, objectives and hypotheses? Does the proposal present a clear justification and conceptual model for the project?

A. Yes - "further monitoring and control is timely and important", "this project is very well justified", "this project is very important in the overall control of purple loosestrife", "the study is justified relative to the existing literature", "this is a needed project which will make a major effort in the control and understanding of purple loosestrife", however the goals and hypotheses could be improved and expanded, "The stated hypothesis is trivial, but several appropriate hypotheses could be generated from the plant and water quality monitoring plan", "how many years is herbicide required", "how long will seeds be viable in the seed bank". B. Yes - In the proposal written part the conceptual model ideas are clear but in model diagram part it is not as clear, "the conceptual model needs to be more project specific".

2. **Likelihood of Success (Approach, Feasibility, Capabilities and Performance Measures).** Is the project likely to succeed based on the approach, feasibility and project team capabilities? Are the proposed performance measures adequate for measuring the project's success?

A. Yes - Excellent overall, all reviews supported the proposal in these areas, "the approach has been carefully constructed, the project is absolutely needed and it is feasible". B. Yes - Good to excellent reviews, a few improvements are suggested, "another level of performance might be XX% of populations eradicated", "there is no explicit detail on number of visits per year - beyond 1"

3. **Outcomes and Products.** Will the project advance the state of scientific knowledge in general and/or make an important contribution to the state of knowledge of the Bay-Delta Watershed? For restoration proposals, is the project likely to contribute to ecosystem restoration or species recoveries in a significant way? Will the project produce products useful to decision-makers and scientists?

A. Yes - "This would be a tremendous benefit to the entire bay-delta ecosystem" B. Yes C. Yes - Excellent reviews - "the results of this project should establish a clear and effective protocol for detection, treatment, and eradication of loosestrife," "the only alternative to this proposal is complete inaction which could be incredibly detrimental to the bay-delta watershed," also ideas of improvement were to have other monitoring goals which relate to control intensity.

4. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed?

A. Yes - Excellent overall - "the budget appears very reasonable and in-kind cost share will be provided by CDFA". One area of concern, "it is important to assess the effectiveness of different control measures and levels of monitoring intensity so that the most cost effective mix of measures can be designed for control of this and other invasive sp."

5. **Regional Review.** How did the regional panel(s) rank the proposal (High, Medium, Low)? Did the regional panel(s) identify significant benefits (regional priorities, linkages with other activities, local involvement) or impediments (local constraints, conflicts with other activities, lack of local involvement) to this proposal? What were they?

A. Delta - Medium - "this is an action-oriented project to control NIS using proven methods". San Joaquin - High Sacramento - High B. Benefits were many, "outreach seems to have engaged people in reporting and has involved WMAs and others", "pilot project has been highly successful at locating infestations and invasion is likely caught early enough to effectively control it" Impediments, "should coordinate with restoration projects", "CALFED funding may be more appropriate for projects that are not within the existing responsibilities of state and federal agencies", "the effect of biological control agents, on other species and habitats of restoration priority should be conducted"

6. **Administrative Review.** Were there significant concerns about the proposal with regard to the prior performance, environmental compliance and budget administrative reviews? What were they?

A. None - all reviews excellent, "The 99-F08 project has been quite successful and has demonstrated the professional, dedicated, and responsible way we wish all CALFED projects could be implemented"

Miscellaneous comments:

None

Delta Regional Review:

Proposal Number: 22

Proposal Title: Expanded Prevention, Detection, and Control of Purple Loosestrife in the CALFED Bay-Delta Watershed

Overall Ranking: -Low **XMedium** -High

Provide a brief summary explanation of the committee's ranking:

This is an action-oriented project to control NIS using proven methods

1. Is the project feasible based on local constraints?

XYes -No

How?

earlier work proved successful

2. Does the project pursue the restoration priorities applicable to the region as outlined in the PSP?

XYes -No

How?

NIS control (MR-1 + DR-5)

3. Is the project adequately linked with other restoration activities in the region, such as ongoing implementation projects and regional planning efforts?

XYes -No

How?

expansion of existing program that is entering final year of funding

4. Does the project adequately involve local people and institutions?

XYes -No

How?

ongoing work, well developed outreach program, expansion of field tested efforts

Other Comments:

no mention of it but may already be planned, coordinate with regional planning efforts being implemented.

should coordinate with restoration projects if have not already done so

San Joaquin Regional Review:

Proposal Number: 22

Applicant Organization: California Department of Food and Agriculture

Proposal Title: Expanded Prevention, Detection, and Control of Purple Loosestrife in the CALFED Bay-Delta Watershed

Overall Ranking: -Low -Medium **XHigh**

Provide a brief summary explanation of the committee's ranking:

The Committee ranks this High if the purple loosestrife problem on the Tuolumne River is an emphasis of the implementation of this proposal. The proposal is an expansion of a successful pilot program to address the problem of Purple Loosestrife. This plant is a relatively recent invader to California and early control has a higher likelihood of success, especially when managed through a successful program.

1. Is the project feasible based on local constraints?

XYes -No

How?

This is a full implementation proposal to follow a successful pilot project to locate and begin treating purple loosestrife infestations. Pilot project has been highly successful at locating infestations and invasion is likely caught early enough to effectively control it.

2. Does the project pursue the restoration priorities applicable to the region as outlined in the PSP?

XYes -No

How?

San Joaquin basin priority #5.

3. Is the project adequately linked with other restoration activities in the region, such as ongoing implementation projects and regional planning efforts?

XYes -No

How?

No link with any particular project, except that survey crews will be in the field where other invasions may be observed. Expansion of Purple Loosestrife to Tuolumne River restoration project sites likely would be detected early. Not clear how this proposal interfaces with perennial Pepperweed proposal by CDFG.

4. Does the project adequately involve local people and institutions?

XYes -No

How?

Outreach seems to have engaged people in reporting and CDFA has involved local County Ag Commissioners, Weed Management Areas and key state, federal agencies. However, it is unclear why this proposal does not indicate involvement of local Weed Management Area groups.

Other Comments:

High rating predicated on understanding that proposal will fund action to control purple loosestrife on the Tuolumne River.

Sacramento Regional Review:

Proposal Number: 22

Applicant Organization: California Department of Food and Agriculture

Proposal Title: Expanded Prevention, Detection, and Control of Purple Loosestrife in the CALFED Bay-Delta Watershed

Overall Ranking: -Low -Medium **XHigh**

Provide a brief summary explanation of the committee's ranking:

Most panel members felt the need for purple loosestrife eradication is high in the Sacramento region. Several panel members felt the eradication effort might be part of the CDFA's mandate, and that CALFED funding may be more appropriate for projects that are not within the existing responsibilities of state and federal agencies.

1. Is the project feasible based on local constraints?

XYes -No

How?

The project is an expansion of an ongoing CDFA project to eliminate purple loosestrife. The current eradication effort is producing positive results. The successful continuation of this effort is likely feasible

2. Does the project pursue the restoration priorities applicable to the region as outlined in the PSP?

XYes -No

How?

The project implements actions to prevent , control, and reduce impacts of non native invasive species, identified in the PSP as priority 5 for the region. Projects to supplement the on-going CDFA Hydrila eradication program are identified as part of priority 1 for the multi-regional area.

3. Is the project adequately linked with other restoration activities in the region, such as ongoing implementation projects and regional planning efforts?

-Yes **X**No

How?

Although the project is a part of the ongoing CDFA purple loosestrife eradication effort, it is not explicitly linked with any other ongoing restoration or regional planning efforts.

4. Does the project adequately involve local people and institutions?

XYes -No

How?

This project includes a significant outreach component, and the applicants cite several examples of how the current outreach program has resulted in improved reporting of purple loosestrife occurrences.

Other Comments:

The continued eradication of purple loosestrife should be a priority for CALFED funding. However, an evaluation of the effect of the eradication methods, particularly the effect of biological control agents, on other species and habitats of restoration priority should be conducted.

External Scientific: #1

Research and Restoration External Scientific Review Form

Proposal Number: **22**

Applicant Organization: **California Department of Food and Agriculture**

Proposal Title: **Expanded Prevention, Detection, and Control of Purple Loosestrife in the CALFED Bay-Delta Watershed**

Conflict of Interest Statements:

I have no financial interest in this proposal.

XCorrect

-Incorrect

In the blank below please explain any connection to proposal, to applicant, co-applicant or subcontractor or to submitting institution (write "none" if no connection):

NONE

Review:

Please provide an overall evaluation summary rating:

Excellent: outstanding in all respects;

Good: quality but some deficiencies;

Poor: serious deficiencies.

Overall Evaluation Summary Rating	Provide a brief explanation of your summary rating
X Excellent	A good project that is narrowly focused (but inexpensive), performs field work that maintains a work team in the Delta, and is very timely.
-Good	
-Poor	

1. **Goals.** Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the concept timely and important?

This project will expand and continue a program to detect, control and prevent purple loosestrife infestation of the Delta. It has three simple and consistent objectives that include surveying to map populations, control & eradication of populations, and an educational outreach campaign. The stated hypothesis is trivial, but several appropriate hypotheses could be generated from the plant and water quality monitoring plan. The plan fulfills the invasive species goal of CALFEDs ERP and other regional plans. The current amount of infestation compared to the enormous potential for infestation over the next decade makes this particularly timely.

2. **Justification.** Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

The program is justified through a clear, well-documented review of effects caused by this weed. It also has a good beginning for a conceptual model, complete with diagram. To improve the model, control actions need to be incorporated. For example, for how many years is herbicide required to completely kill all living plants? How long will seeds be viable in the seed bank? If this information is absent from the literature, then useful hypotheses could be developed and tested. Without a full-scale implementation project, this weed will continue to spread into other areas of the Delta.

3. **Approach.** Is the approach well designed and appropriate for meeting the objectives of the project? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology or approaches? Will the information ultimately be useful to decision-makers?

The approach is has been carefully constructed. It make good use of the seasonal nature of the plant to develop a work plan. They will use up to date integrated pest management to apply suitable methods to different situations. Post treatment monitoring is essential and could be designed (and perhaps is, though details were not included in the proposal) to test hypotheses and add significantly to our understanding of Lythrum and invasive species in general. The education portion is welcome and has proven very useful on a practical level.

4. **Feasibility.** Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives?

The project is absolutely needed and it is feasible, since it builds on an already successful program. However, will it be possible to eradicate all of the purple loosestrife in the Delta within the three years? I think Tuolumne River site worries the authors. How many years will such a program need to depend upon CALFED funds? Can invasive weed programs be combined or integrated to realize a savings in expense?

5. **Project-Specific Performance Measures.** Does the project include appropriate performance measures to measure success relative to the project's goals and objectives? Is there enough detail as to how the performance measures will be quantified? For restoration projects, are monitoring plans explicit and detailed enough to determine if performance measures will be adequately assessed?

Performance measures outlined in the proposal were merely the paragraphs repeated from the approach section. Measures such as 'less than 10 % of the number of stems of the original population are found to return within a year' might be a reasonable measure and criteria for some methods (herbicide). Other methods may achieve greater eradication rates. Another level of performance might be XX % of populations eradicated.

6. **Products.** Are products of value likely from the project? Specifically for restoration projects, are products of value also likely from the monitoring component? Are interpretative outcomes likely from the project?

Treatment and monitoring results will be shared using presentations, training, outreach materials and reports. Instead of laboring to get maps to collaborators, the applicant should get the maps on their web site. Also, include a reporting form that can be filled out and submitted right on the web.

7. **Capabilities.** What is the track record of applicants in terms of past projects? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

The applicants have been leading the program to detect, eradicate and prevent spread of this weed for three years. It appears they are having excellent success. They also have the statutory authority to lead such a program.

8. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed?

The budget appears very reasonable and in-kind cost share will be provided by lead agency (oversight, etc.). The cost share should be documented.

Miscellaneous comments:

External Scientific: #2

Research and Restoration External Scientific Review Form

Proposal Number: **22**

Applicant Organization: **California Department of Food and Agriculture**

Proposal Title: **Expanded Prevention, Detection, and Control of Purple Loosestrife in the CALFED Bay-Delta Watershed**

Conflict of Interest Statements:

I have no financial interest in this proposal.

XCorrect

-Incorrect

In the blank below please explain any connection to proposal, to applicant, co-applicant or subcontractor or to submitting institution (write "none" if no connection):

None

Review:

Please provide an overall evaluation summary rating:

Excellent: outstanding in all respects;

Good: quality but some deficiencies;

Poor: serious deficiencies.

Overall Evaluation Summary Rating	Provide a brief explanation of your summary rating
X Excellent	This is an excellent proposal, with a high likelihood of completing its objectives. I particularly like the combination of mapping and monitoring of exotic populations, eradication of known populations, and involving the public to act as "weed patrols". Purple loosestrife invasion is still in its early stages, and the probability of successful control is highest at this time. Delaying action until the populations are larger will only make the job more difficult, more expensive, and less likely to be successful.
-Good	
-Poor	

1. **Goals.** Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the concept timely and important?

The authors propose to reduce the infestation of purple loosestrife in the area, a very important project. Their goals and objectives are to document its occurrence in the Delta, expand control efforts, and to expand educational outreach. As the authors point out, this exotic species has caused tremendous problems in other regions of the country, and has been identified as likely to expand rapidly in California ecosystems. Given that the invasion in California is in its early stages when control efforts are more likely to succeed, this project is very timely. I also applaud the three-pronged approach of documentation, control, and

involving the public in the surveying of the region.

2. **Justification.** Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

The project is very well justified. The impacts of purple loosestrife in other parts of the country are well known, and aggressive control of the California invasion would be very worthwhile. The authors' conceptual model involves implementing control measures to reduce the invasion before loosestrife populations get established any more than they are. The proposal is the continuation of previously CALFED funded work, and the authors argue that the two years already completed have produced important information about the invasion. In particular, they have identified additional populations that could become established and expand the invasion. This is an important model for the control in the early stages of an invasion.

3. **Approach.** Is the approach well designed and appropriate for meeting the objectives of the project? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology or approaches? Will the information ultimately be useful to decision-makers?

The approach is well designed, and indeed has already been implemented in the first two years of the project that are already underway. Mapping occurrences of loosestrife is an essential step in its eradication, and the authors have placed special emphasis on using these surveys to identify new plant or animal invaders. The control and removal, with follow-up surveys and treatments, is well-designed and based on current methodology. The proposed project will also aid fine-tuning of management techniques. The education of the public to increase awareness of invasive species and to aid identification of exotic populations is an excellent approach that is likely to be applicable to other projects.

4. **Feasibility.** Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives?

Given the progress already made in the project so far, I think that the proposal is very likely to complete its objectives. Taking a passive, or a "wait-and-see" attitude toward loosestrife would have a very high probability of resulting in a major invasion. I think that the authors' active approach, including documentation of new populations and involving the public in the control, is the best method to reduce the invasion.

5. **Project-Specific Performance Measures.** Does the project include appropriate performance measures to measure success relative to the project's goals and objectives? Is there enough detail as to how the performance measures will be quantified? For restoration projects, are monitoring plans explicit and detailed enough to determine if performance measures will be adequately assessed?

Yes, the documentation of loosestrife populations will allow assessment of the ongoing invasion. The followup strategy is very complete, including population measures, eradication efficacy, and measures of the impact of herbicide on water quality.

6. **Products.** Are products of value likely from the project? Specifically for restoration projects, are products of value also likely from the monitoring component? Are interpretative outcomes likely from the project?

The efforts this proposal devotes to quantitative mapping of loosestrife populations and to the education of the public in identifying populations are highly likely to have additional benefits beyond just control of loosestrife. There are many possible invaders of the Bay-Delta region that could be recognized in the course of this sampling. This would be a tremendous benefit to the entire bay-delta ecosystem, as the early stages of invasions are when control is most likely to be successful.

7. **Capabilities.** What is the track record of applicants in terms of past projects? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

The California Dept. of Food and Agriculture is the state agency responsible for the control of exotic organisms in the state, so it is highly appropriate that they take the lead in the effort to control loosestrife. The specific applicants appear to have a great deal of experience with weed control, including the publication of scientific papers on loosestrife. They also have experience with the project they have proposed, given that they have already completed a pilot of the study.

8. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed?

The budget appears reasonable, and reflects the need for multiple staff people working on the various aspects of the project. Among the supplies, the authors are requesting funds to purchase a GPS unit, which is justified considering the mapping objectives of their proposal.

Miscellaneous comments:

External Scientific: #3

Research and Restoration External Scientific Review Form

Proposal Number: **22**

Applicant Organization: **California Department of Food and Agriculture**

Proposal Title: **Expanded Prevention, Detection, and Control of Purple Loosestrife in the CALFED Bay-Delta Watershed**

Conflict of Interest Statements:

I have no financial interest in this proposal.

XCorrect

-Incorrect

In the blank below please explain any connection to proposal, to applicant, co-applicant or subcontractor or to submitting institution (write "none" if no connection):

I am the USDA-NRCS person on CINWCC (Calif. Interagency Noxious Weed Corrdinating Committee) of which Steve Schoening is chair.

Review:

Please provide an overall evaluation summary rating:

Excellent: outstanding in all respects;

Good: quality but some deficiencies;

Poor: serious deficiencies.

Overall Evaluation Summary Rating	Provide a brief explanation of your summary rating
X Excellent	This project is very important in the overall control of purple loosestrife. CDFA has made good use of previous funding on the loosestrife war and this funding will complete the process.
-Good	
-Poor	

1. **Goals.** Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the concept timely and important?

Excellent yes, yes.

2. **Justification.** Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

Excellent yes, yes, yes.

This is a needed project which will make a major effort in the control and understanding of purple lossestrife.

3. **Approach.** Is the approach well designed and appropriate for meeting the objectives of the project? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology or approaches? Will the information ultimately be useful to decision-makers?

Excellent yes, yes, yes, yes.

4. **Feasibility.** Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives?

Excellent yes, good, yes.

5. **Project-Specific Performance Measures.** Does the project include appropriate performance measures to measure success relative to the project's goals and objectives? Is there enough detail as to how the performance measures will be quantified? For restoration projects, are monitoring plans explicit and detailed enough to determine if performance measures will be adequately assessed?

Excellent yes, yes.

6. **Products.** Are products of value likely from the project? Specifically for restoration projects, are products of value also likely from the monitoring component? Are interpretative outcomes likely from the project?

Excellent yes, yes, yes.

7. **Capabilities.** What is the track record of applicants in terms of past projects? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

Excellent Excellent, yes, yes.

8. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed?

Excellent yes.

Miscellaneous comments:

External Scientific: #4

Research and Restoration External Scientific Review Form

Proposal Number: **22**

Applicant Organization: **California Department of Food and Agriculture**

Proposal Title: **Expanded Prevention, Detection, and Control of Purple Loosestrife in the CALFED Bay-Delta Watershed**

Conflict of Interest Statements:

I have no financial interest in this proposal.

XCorrect

-Incorrect

In the blank below please explain any connection to proposal, to applicant, co-applicant or subcontractor or to submitting institution (write "none" if no connection):

none

Review:

Please provide an overall evaluation summary rating:

Excellent: outstanding in all respects;

Good: quality but some deficiencies;

Poor: serious deficiencies.

Overall Evaluation Summary Rating	Provide a brief explanation of your summary rating
X Excellent	This project is highly time critical for its success. Purple loosestrife has invaded the region, and control efforts are needed to prevent the continued expansion of this exotic. This program team has the technical capabilities and the background in conducting a project of this nature. The two problems with this proposal (1: seed bank viability, 2: poor conceptual model) are adequately addressed elsewhere in the proposal (1: noted that treatments need to be monitored beyond the 3 year scope of this proposal; 2: clear text laying out the critical nature of this project and the potential implications for the system if the project is not funded) and should not necessarily be considered a limiting factor in determining the suitability of this project for funding.
-Good	
-Poor	

1. **Goals.** Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the concept timely and important?

The goals and objectives of this project are clearly stated, as well as the potential outcome if this type of project is not undertaken. The project is very timely and important for the early control of purple loostrife in the entire regio

2. **Justification.** Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

The study is justified relative to the existing literature. The proposal clearly identifies the need for this project to be pursued beyond the 3 years of funding being requested as the elimination of purple loosestrife is ultimately linked to the elimination of its seedbank. While the authors suggest that a 5 year program may be adequate to ensure elimination of the seedbank, there is no documentation supporting this time frame from either a control perspective or a seed bank viability perspective. While this is a gap in the information presented, it also highlights the critical importance of the proposed project being undertaken sooner rather than later. There is a conceptual model presented in the proposal; however, it does not provide a clear picture of the processes involved in this project. The intent of a conceptual model is to provide the reader a clear overview for the basis of the proposed work. The model included in the proposal does not contribute to the case being made for the proposed research as the text of the proposal is clearer to follow. However, it is important to note that the case made for the proposed project is clearly made in the text.

3. **Approach.** Is the approach well designed and appropriate for meeting the objectives of the project? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology or approaches? Will the information ultimately be useful to decision-makers?

The approach is appropriate for meeting the project objectives. Previous complete and successful work conducted by this group on similar projects further suggests the proposed approach is appropriate. Results from this project are limited to information about either the potential spread or the potential elimination of this exotic. While this project is not designed to generate novel information, the effort to get ahead of the curve on purple loosestrife in a region that has heretofore only been marginally impacted (i.e., as opposed to areas in the northeast US) will be ultimately useful to managers and decision-makers in this and other regions.

4. **Feasibility.** Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives?

The approach is fully documented and technically feasible as presented, with the exception of the gap of information presented on the seedbank of this species (as discussed above). The multi-prong approach has a high likelihood of success as this approach appears to be successful from other efforts, and the system has not been extensively impacted by purple loosestrife yet. The scale of the project appears to be consistent with the objectives established. The critical need to get this project underway sooner rather than later appears to dictate ultimate success (i.e., many years past the conclusion of this project's funding) of the eradication program.

5. **Project-Specific Performance Measures.** Does the project include appropriate performance measures to measure success relative to the project's goals and objectives? Is there enough detail as to how the performance measures will be quantified? For restoration projects, are monitoring plans explicit and detailed enough to determine if performance measures will be adequately assessed?

The monitoring program designed to measure success of purple loosestrife eradication should satisfy the the project's goals and objectives. The GIS mapping over multiple years should be adequate to determine if individuals or populations are successfully eradicated. There is no explicit detail on number of visits per year (beyond 1) identified to ensure that treated individuals/populations do not re-establish. While results from previous similar projects

presented do not suggest it, it is theoretically possible that re-growth may occur after a post-treatment visit during a growing season.

6. **Products.** Are products of value likely from the project? Specifically for restoration projects, are products of value also likely from the monitoring component? Are interpretative outcomes likely from the project?

Products from this project of value include educational information as well as a long-term database on the distribution and abundance of purple loosestrife in the region. Interpretive outcomes from the project include post-treatment data from three different eradication approaches that could provide insight into the most useful tools for purple loosestrife control efforts in the region.

7. **Capabilities.** What is the track record of applicants in terms of past projects? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

The project team has both the expertise and previous experience in conducting similar projects. They appear to have the appropriate infrastructure.

8. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed?

The budget appears adequate for the work proposed. Previous projects of this nature were presented, however, no information about the funding for those in relation to the project size/success were presented to provide comparative information.

Miscellaneous comments:

External Scientific: #5

Research and Restoration External Scientific Review Form

Proposal Number: **22**

Applicant Organization: **California Department of Food and Agriculture**

Proposal Title: **Expanded Prevention, Detection, and Control of Purple Loosestrife in the CALFED Bay-Delta Watershed**

Conflict of Interest Statements:

I have no financial interest in this proposal.

XCorrect

-Incorrect

In the blank below please explain any connection to proposal, to applicant, co-applicant or subcontractor or to submitting institution (write "none" if no connection):

None

Review:

Please provide an overall evaluation summary rating:

Excellent: outstanding in all respects;

Good: quality but some deficiencies;

Poor: serious deficiencies.

Overall Evaluation Summary Rating	Provide a brief explanation of your summary rating
X Excellent	The short term impact of this project in detecting and eradicating loosestrife, as well as the long term usefulness of the database provided, will benefit the entire delta.
-Good	
-Poor	

1. **Goals.** Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the concept timely and important?

Excellent.

2. **Justification.** Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

Excellent. As a follow-up to a previous pilot study, this project is well positioned to be effective at detection and treatment of an invasive non-native species.

3. **Approach.** Is the approach well designed and appropriate for meeting the objectives of the project? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology or approaches? Will the information ultimately be useful to decision-makers?

Excellent. The approach has been fully tested in the earlier pilot study.

4. **Feasibility.** Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives?

Good. While attempting to eradicate invasive species is always a difficult proposition, the likelihood of success is greatly enhanced with this proposal by the network of partner agencies that will be assisting.

5. **Project-Specific Performance Measures.** Does the project include appropriate performance measures to measure success relative to the project's goals and objectives? Is there enough detail as to how the performance measures will be quantified? For restoration projects, are monitoring plans explicit and detailed enough to determine if performance measures will be adequately assessed?

Good +. The adaptive management approach proposed will rely on annual review. Annual review may prove to be too long an interval to adjust application of herbicides, should a problem become apparent. However, all methods being considered are reported to have benign environmental effects, or have passed CEQA equivalent review. Further, CDFA has considerable expertise in treatment follow-up.

6. **Products.** Are products of value likely from the project? Specifically for restoration projects, are products of value also likely from the monitoring component? Are interpretative outcomes likely from the project?

Excellent. the results of this project should establish a clear and effective protocol for detection, treatment, and eradication of loosestrife.

7. **Capabilities.** What is the track record of applicants in terms of past projects? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

Excellent. This is a continuation of a previous 3 year pilot study with demonstrated successful results.

8. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed?

Excellent. The results of the pilot study indicate a reasonable expectation of success for this project. Inaction may well allow the spread of this species throughout the delta.

Miscellaneous comments:

External Scientific: #6

Research and Restoration External Scientific Review Form

Proposal Number: **22**

Applicant Organization: **California Department of Food and Agriculture**

Proposal Title: **Expanded Prevention, Detection, and Control of Purple Loosestrife in the CALFED Bay-Delta Watershed**

Conflict of Interest Statements:

I have no financial interest in this proposal.

XCorrect

-Incorrect

In the blank below please explain any connection to proposal, to applicant, co-applicant or subcontractor or to submitting institution (write "none" if no connection):

NONE

Review:

Please provide an overall evaluation summary rating:

Excellent: outstanding in all respects;

Good: quality but some deficiencies;

Poor: serious deficiencies.

Overall Evaluation Summary Rating	Provide a brief explanation of your summary rating
X Excellent	I found the technical aspects of the project to be outstanding. The only points of concern being lack of discussion on biological control organisms being used and some minor proofreading oversights.
-Good	
-Poor	

1. **Goals.** Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the concept timely and important?

The goals and objectives are clearly stated and internally consistent if not a little redundant. The control and prevention of purple loosestrife is very timely and important with the 11 county area in the early stages of infestation. Their proposal, which is a continuation of a previously funded CALFED grant, encompasses a wide geographic area focusing on prevention, eradication, and control of all non-native invasive aquatic weeds and pests.

2. **Justification.** Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

The study is justified relative to existing knowledge. Their work is imperative to prevent the spread of a noxious weed. The conceptual model is present in the proposal, but I found it to be too general in nature. The conceptual model needs to be more project specific. The selection of full-scale implementation is justified in this project that includes education outreach, surveying, and eradication efforts. No true research is being conducted and the pilot of this project has already been completed.

3. **Approach.** Is the approach well designed and appropriate for meeting the objectives of the project? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology or approaches? Will the information ultimately be useful to decision-makers?

The approach is well-designed and appropriate for meeting the objectives of the proposal. The only aspect of the project that I am disappointed about is the information provided on the release of biological control organisms. From my understanding of these species, they are perfectly safe for release, but the proposal skimmed over this part of the project. I am confident that there is no need for concern, but it is a very interesting facet that is only briefly touched upon. The project, by nature, will not generate novel information except for new infestation reports for the 11 county area. Their efforts are of great importance; however, because of the destruction created by non-native infestations. The information (especially GIS work) will most likely be useful to decision-makers in the near future. Most importantly though, is the fact that their work will prevent potential environmental degradation.

4. **Feasibility.** Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives?

The approach is fully documented and technically feasible. This is demonstrated in part by their successes of their preceding CALFED grant. The likelihood of success is relatively high considering the complex issues to manage when dealing with prolific exotics. The scale of the project is very consistent with the stated objectives of expanded prevention, detection, and control.

5. **Project-Specific Performance Measures.** Does the project include appropriate performance measures to measure success relative to the project's goals and objectives? Is there enough detail as to how the performance measures will be quantified? For restoration projects, are monitoring plans explicit and detailed enough to determine if performance measures will be adequately assessed?

Many performance measures are built-in to this project. Project monitoring includes treatment and eradication efficacy as well as water sampling. Their previous work included copious amounts of information transfer and communication to/with CALFED to ensure proper performance measures.

6. **Products.** Are products of value likely from the project? Specifically for restoration projects, are products of value also likely from the monitoring component? Are interpretative outcomes likely from the project?

The only alternative to this proposal is complete inaction which could be incredibly detrimental to the Bay-Delta Watershed. The product of value in this case is the prevention of purple-loosestrife monocultures. The monitoring part of this project is part of the performance measures to determine project success. In addition, many of CALFED's priorities are addressed in this proposal.

7. **Capabilities.** What is the track record of applicants in terms of past projects? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

I found the applicants to be true professionals. They are more than qualified to efficiently and effectively implement this project. All 3 applicants have sufficient experience in their respective areas of expertise. They have the available infrastructure within the CDFA, and they also have the support of other non-governmental, state, and federal agencies such as PHPPS, IPC, DU, USDA, etc. Also, the CDFA has the responsibility of non-native invasive control.

8. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed?

I found the budget to be very reasonable for the amount of work to be performed. While the amount of in-kind support is not specifically addressed, it is very significant in projects such as these. I found nothing in the budget that seemed excessive.

Miscellaneous comments:

In future proposals, a more detailed budget justification would be much appreciated for all of the proposals.

External Scientific: #7

Research and Restoration External Scientific Review Form

Proposal Number: **22**

Applicant Organization: **California Department of Food and Agriculture**

Proposal Title: **Expanded Prevention, Detection, and Control of Purple Loosestrife in the CALFED Bay-Delta Watershed**

Conflict of Interest Statements:

I have no financial interest in this proposal.

XCorrect

-Incorrect

In the blank below please explain any connection to proposal, to applicant, co-applicant or subcontractor or to submitting institution (write "none" if no connection):

none

Review:

Please provide an overall evaluation summary rating:

Excellent: outstanding in all respects;

Good: quality but some deficiencies;

Poor: serious deficiencies.

Overall Evaluation Summary Rating	Provide a brief explanation of your summary rating
-Excellent	If the fears about uncontrolled purple loosestrife are well-founded (and I suspect that they are, though I'm not an authority on this), then this project is justified if only to attempt to control purple loosestrife per se. However, the project could deliver other very useful results as well if care is taken to design monitoring and control protocols in such a way as to compare the effectiveness of different treatments and intensities. With this kind of information future invasive species control measures could be developed more cost effectively.
XGood	
-Poor	

1. **Goals.** Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the concept timely and important?

The goals are clearly stated and consistent: Continue monitoring and control efforts of purple loosestrife in the Bay-Delta region. Previous monitoring has turned up several more purple loosestrife populations than previously documented, so further monitoring and control is timely and important.

2. **Justification.** Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

Further control efforts are justified - on the assumption, of course, that purple loosestrife poses a significant threat to wetlands in the region. The authors cite research, mostly from the eastern U.S., which indicates that purple loosestrife can crowd out native species and impair hydrologic functions to a degree that may impact water quality and flood control benefits of wetlands. So the potential detrimental effects of uncontrolled purple loosestrife populations are significant.

3. **Approach.** Is the approach well designed and appropriate for meeting the objectives of the project? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology or approaches? Will the information ultimately be useful to decision-makers?

The approach involves education and outreach, comprehensive monitoring efforts, and physical removal or treatment with herbicide for control. These methods have apparently been successful so far, so their continuation seems warranted. The project could also potentially generate information on the relative effectiveness of the different components in this mix of strategies, as well as the intensity of each. For example, is comprehensive monitoring required every year, or would monitoring every other year be sufficient? If the program can be adjusted to facilitate answering questions like this, then it could be even more useful for decision-makers because the results might be more generally applicable to other efforts at controlling invasive species. Another way that we could do more with less is to integrate the monitoring of all invasive species in the region into one coherent program. The authors speak to this briefly in the proposal; I wonder if more could be done.

4. **Feasibility.** Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives?

The authors indicate initial success from the first two years of the project. It remains to be seen whether or not a sustained effort at this level will be too little, just right, or not enough. But this could be one of the most useful results: How much effort is necessary to control a moderately aggressive invasive wetland plant? Insofar as data is collected so that this question can be addressed, then the project guarantees success on some level. Effective control or eradication is the preferred result, of course, but in a broader sense any information on the level of effort required (in terms of person-hours and dollars) to control non-native species could be very useful to decision makers.

5. **Project-Specific Performance Measures.** Does the project include appropriate performance measures to measure success relative to the project's goals and objectives? Is there enough detail as to how the performance measures will be quantified? For restoration projects, are monitoring plans explicit and detailed enough to determine if performance measures will be adequately assessed?

Performance measures are based largely on assessing the effectiveness of control measures - physical removal of plants and herbicide applications - by going back to the treated sites and measuring population size and/or seed viability. This is certainly appropriate, but another aspect of performance could be measured as well. It would be useful to know what the relationship is between observer effort and detection, given the presence of purple loosestrife in an area. This could be determined by varying the level of effort across sites or varying the number of times a site is searched in a single season.

6. **Products.** Are products of value likely from the project? Specifically for restoration projects, are products of value also likely from the monitoring component? Are interpretative outcomes likely from the project?

The main product envisaged is control or eradication of purple loosestrife in the Bay-Delta region. I've mentioned several other possible goals in my answers to previous questions, and I think the value of the project could be enhanced if these or similar ones are pursued as well. These other goals could come about essentially as by-products of the project as described in the proposal, but they are more likely if monitoring is explicitly designed to deliver them. In any case, it is likely that a sustained monitoring effort will be necessary even if purple loosestrife is eradicated in the 3 year life of this project, to ensure it hasn't been reintroduced, so assessment of the level of effort required for this longer term task would be very useful for decision makers.

7. **Capabilities.** What is the track record of applicants in terms of past projects? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

Based on reported success of initial efforts, the team appears qualified for the project as described. If project goals are expanded along the lines I've suggested here then consultation with other experts may be warranted.

8. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed?

The main thrust of my comments so far go directly to this question of costs and benefits. The benefits of controlling purple loosestrife in the region are presumed very large (large enough to justify the project costs anyway), and I'll take that at face value. However, it will still be important to assess the effectiveness of different control measures and levels of monitoring intensity so that the most cost effective mix of measures can be designed for control of this and other invasive species in the future. Will \$150,000 per year in perpetuity be required to control each invasive species in the region? Will it actually require more money, or can we do it for less? Can monitoring and control measures for multiple species be combined so that we can control ALL invasive species in the region for just a little bit more than that required for a single species?, etc. There is an opportunity here to begin to address some of these questions, and I suspect that only slight adjustments to the project design would be required.

Miscellaneous comments:

Prior Performance/Next Phase Funding: #1

New Proposal Number: 22

New Proposal Title: Expanded Prevention, Detection, and Control of Purple Loosestrife in the CALFED Bay-Delta Watershed

1. Prior CALFED project numbers, titles, and programs: *(list only projects for which you are the contract manager)*

ERP 99-N11 - Purple Loosestrife Prevention, Detection & Control Actions for the Sacramento-San Joaquin River Delta System

2. Prior CVPIA project numbers, titles, and programs: *(list only projects for which you are the contract manager)*

N/A

3. Have negotiations about contracts or contract amendments with this applicant proceeded smoothly, without persistent difficulties related to standard contract terms and conditions?

XYes -No -N/A

If no, please explain any difficulties:

4. Are the status, progress, and accomplishments of the applicant's current CALFED or CVPIA project(s) accurately stated?

XYes -No -N/A

If no, please explain any inaccuracies:

5. Is the applicant's progress towards these project(s)' milestones and outcomes to date satisfactory?

XYes -No -N/A

If no, please explain deficiencies:

6. Is the applicant's reporting, records keeping, and financial management of these projects satisfactory?

XYes -No -N/A

If no, please explain deficiencies:

7. Will the project(s) be ready for next phase funding in 2002, based on its current progress and expenditure rates?

XYes -No -N/A

If no, please explain:

Other Comments:

Prior Performance/Next Phase Funding: #2

New Proposal Number: 22

New Proposal Title: Expanded Prevention, Detection, and Control of Purple Loosestrife in the CALFED Bay-Delta Watershed

1. Prior CALFED project numbers, titles, and programs: *(list only projects for which you are the contract manager)*

99-F08 Purple Loosestrife Prevention, Detection, & Control in the Sac/SJ Delta and Associated Hyrdologic Units.

2. Prior CVPIA project numbers, titles, and programs: *(list only projects for which you are the contract manager)*
3. Have negotiations about contracts or contact amendments with this applicant proceeded smoothly, without persistent difficulties related to standard contract terms and conditions?

XYes -No -N/A

If no, please explain any difficulties:

4. Are the status, progress, and accomplishments of the applicant's current CALFED or CVPIA project(s) accurately stated?

XYes -No -N/A

If no, please explain any inaccuracies:

5. Is the applicant's progress towards these project(s)' milestones and outcomes to date satisfactory?

XYes -No -N/A

If no, please explain deficiencies:

6. Is the applicant's reporting, records keeping, and financial management of these projects satisfactory?

XYes -No -N/A

If no, please explain deficiencies:

7. Will the project(s) be ready for next phase funding in 2002, based on its current progress and expenditure rates?

XYes -No -N/A

If no, please explain:

Other Comments:

The 99-F08 project has been quite successful and has demonstrated the professional, dedicated, and responsible way we wish all CALFED projects could be implemented. CDFA has carried out the tasks and duties of this project as well as many that are above and beyond the requirements of the project. I recommend approval of this proposal to move the project into the next phase, so we dont lose ground on the early success of current implementation.

Environmental Compliance:

Proposal Number: 22

Applicant Organization: California Department of Food and Agriculture

Proposal Title: Expanded Prevention, Detection, and Control of Purple Loosestrife in the CALFED Bay-Delta Watershed

1. Are the legal or regulatory issues that affect the proposal identified adequately in the proposal?

☒Yes ☐No

If no, please explain:

- If there are programmatic environmental documents and permits from previously-funded eradication work that would apply to this project as well. In addition:

Obtaining permission to access properties would be required.

2. Does the project's timeline and budget reflect adequate planning to address legal and regulatory issues that affect the proposal?

☒Yes ☐No

If no, please explain:

Unless the proposed work requires additional environmental compliance as identified above.

3. Do the legal and regulatory issues that affect the proposal significantly impair the project's feasibility?

☐Yes ☒No

If yes, please explain:

Other Comments:

Budget:

Proposal Number: 22

Applicant Organization: California Department of Food and Agriculture

Proposal Title: Expanded Prevention, Detection, and Control of Purple Loosestrife in the CALFED Bay-Delta Watershed

1. Does the proposal include a detailed budget for each year of requested support?

XYes -No

If no, please explain:

2. Does the proposal include a detailed budget for each task identified?

XYes -No

If no, please explain:

3. Does the proposal clearly state the type of expenses encompassed in indirect rates or overhead costs?

XYes -No

If no, please explain:

4. Are appropriate project management costs clearly identified?

XYes -No

If no, please explain:

5. Do the total funds requested (Form I, Question 17A) equal the combined total annual costs in the budget summary?

XYes -No

If no, please explain (for example, are costs to be reimbursed by cost share funds included in the budget summary).

6. Does the budget justification adequately explain major expenses?

XYes -No

If no, please explain:

7. Are there other budget issues that warrant consideration?

-Yes ☒No

If yes, please explain:

Other Comments:

in the budget justification under equip, it calculates \$26,000 yet in the budget summary in year 1 only for equip it states \$14,000.