Supplemental Report on the Potential Impacts to Panther Habitat From the Proposed Bellmar and Rural Lands West Development Projects

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Background: Property owners in rural eastern Collier County previously proposed residential and mining developments of approximately 45,000 acres within the current range of the endangered Florida panther. These developments would have been covered by the Eastern Collier Multiple Species Habitat Conservation Plan (ECMSHCP), and would have brought hundreds of thousands of new residents to this environmentally sensitive area. In 2018, I used a published random forest panther habitat model (Frakes et al. 2015) to predict how adult panther breeding habitat and habitat linkages within the study area would be impacted by the proposed development(s). The study predicted substantial losses of adult panther (breeding) habitat in terms of both habitat quantity (areal extent) and quality. The model also predicted damages to north-south panther corridors, mostly in the form of narrowing of these important linkages allowing panthers to move to and from habitat areas to the north, which is critical for panther recovery. The report concluded that approval and implementation of the ECMSHCP would appreciably reduce the likelihood of survival and recovery of the Florida panther (Frakes 2018).

Recently, attempts to obtain approval for the ECMSHCP from regulatory agencies were abandoned by the Eastern Collier Property Owners, who have apparently decided to adopt a piecemeal approach, in which smaller developments within the Rural Lands Stewardship Area (RLSA) would be submitted for approval, one at a time. The furthest along of these developments, Bellmar, is now under consideration by the Florida Department of Environmental Protection and the U.S. Fish and Wildlife Service. Another potential development location, Rural Lands West (RLW), is adjacent to Bellmar to the north, and may also soon be under consideration for approval. Some of the predicted impacts from these developments have already been presented in a previous report (Frakes 2018). The purpose of the present supplemental report is to focus more narrowly on Bellmar and RLW, since they seem to be among the first projects being considered individually. Also, the present report utilizes more recent landscape data that was not available in 2018. This report should be considered supplemental to Frakes (2018) since that document provides a better understanding of these projects within the context of the larger RLSA development picture.

Methods: The landscape-scale adult panther habitat model used in this study was identical to that described by Frakes et al. (2015). The methods for using the model to predict impacts to adult panther habitat were the same or similar to those used in Frakes (2018). Please see those documents for more details. Briefly, landscape characteristics such as vegetative landcover, land use, human population density, road density, forest edge, and hydrology in 1-km^2 grid cells are analyzed by the model to predict the probability of panther presence (P) in each cell. The grid cells potentially to be impacted by Bellmar and RLW were run through the model under existing conditions (c. 2020), and again using various assumptions for variable values to depict conditions after development. Model outputs for pre- and post-development were then compared in order to quantify impacts to adult panther habitat. A grid cell was classified as adult panther

habitat when the model-predicted P value was > 0.338 (Frakes et al. 2015). Shapefiles depicting project impact areas, new roads, and stormwater lakes expected for the two new developments were provided by the Conservancy of Southwest Florida. For this analysis, the study area was defined by drawing a box 5 km wide (east to west) and 14 km long (north to south) to include the impact areas of both Bellmar and RLW. As such, the study area contained 70 model grid cells (70 km^2).

Results: Figure 1 shows the existing (before development) adult panther habitat in the study area and surrounding areas as predicted by the adult panther habitat model, using a cutoff value of P=0.338 (Frakes et al. 2015). As shown, currently there is a great deal of important panther breeding habitat within and near the proposed developments. Within the 70 km^2 study area, 43 grid cells (10,625 acres) were classified as adult panther habitat under existing landscape conditions.

Figure 2 shows the model output based on projected changes to the landscape that will occur if the Bellmar and RLW projects are developed as proposed. Within the 70 km^2 study area, only 20 grid cells (4942 acres) were predicted to continue to be useful to adult panthers after development of the two areas. This represents a predicted loss of 23 km^2 (5683 acres) of panther habitat.

Figures 3 and 4 show interpolated or smoothed versions of the panther habitat suitability data predicted by the model. These interpolated maps allow relative habitat values and habitat corridors to be seen more easily. Figure 3 shows the existing north-south panther habitat connection (Camp Keais Strand) between Florida Panther NWR and Corkscrew Swamp, in relation to the proposed location of the Bellmar and RLW developments. Figure 4 shows the predicted impacts to this important corridor after development of the two projects. The predicted narrowing of this corridor as shown is likely to adversely impact north-south panther movements in this part of their range. Connectivity to the north is essential for panther recovery.

A common mistake made by project reviewers (such as USFWS) in their effects analysis is to compare the project area to the average size of a single panther home range. A statement is then made to the effect that this project only affects a small percentage of a single panther's home range. This approach is incorrect and misleading. Panther home ranges overlap, and a project may affect multiple panther home ranges. During previous habitat studies (Frakes et al. 2015, Frakes 2018) we calculated minimum convex polygon home ranges for 87 adult panthers using telemetry data from 2004-2013. Overlaying these home ranges on the project impact areas (Figure 5) shows that the Bellmar project alone would have impacted the home ranges of 7 out of 87 (8.0%) of all radio-collared adult panthers if it had been built during that time period. If the project is constructed, the actual number of panther home ranges impacted today will probably be greater because most panthers were not radio-collared and panther numbers have increased since then according to official estimates.

Conclusions: In summary, this analysis predicts the following combination of adverse effects to the Florida panther if the Bellmar and RLW projects are constructed as proposed:

1. *Direct loss of approximately 5,600 acres of prime panther breeding habitat.* USFWS used an outdated and scientifically flawed methodology (see discussion in Frakes et al. 2015) to calculate compensation for this loss by preserving (i.e., not developing) part of the project area. Mere preservation of already existing habitat does not compensate for the lost biological function of the habitat that will be destroyed. No net loss of panther habitat function has been recommended repeatedly by panther scientists (Kautz et al. 2006, Frakes et al. 2015, others).

2. *Narrowing and degradation of an important panther movement corridor.* The proposed project substantially intrudes into the western side of the narrow habitat corridor that extends between Florida Panther National Wildlife Refuge and the Corkscrew Swamp, causing a "pinch point" that will impede panther movements to the north. Free movement of panthers through dispersal corridors such as this is essential to panther recovery.

3. *Reductions and shifts in the home ranges of multiple adult panthers.* The exact number of panthers that will be affected is unknown, but historical use data suggests the number is at least seven and probably more. Shifting and/or compression of home ranges may result in increased competition for limited resources and increase the probability of intraspecific aggression, a leading cause of panther mortality.

References:

Eastern Collier Property Owners, 2018. Eastern Collier Multiple Species Habitat Conservation Plan, Revised August 2018. Report prepared by Stantec Consulting Services for the Eastern Collier Property Owners for submittal to the US Fish and Wildlife Service.

Frakes, R.A., R.C. Belden, B.E. Wood and F.E. James. 2015. Landscape analysis of adult Florida panther habitat. PLoS ONE 10(7): e0133044.doi:10.1371/journal.pone.0133044.

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Kautz R, Kawula R, Hoctor T, Comiskey J, Jansen D, Jennings D, et al. 2006. How much is enough? Landscape-scale conservation for the Florida panther. Biological Conservation 130: 118–133.
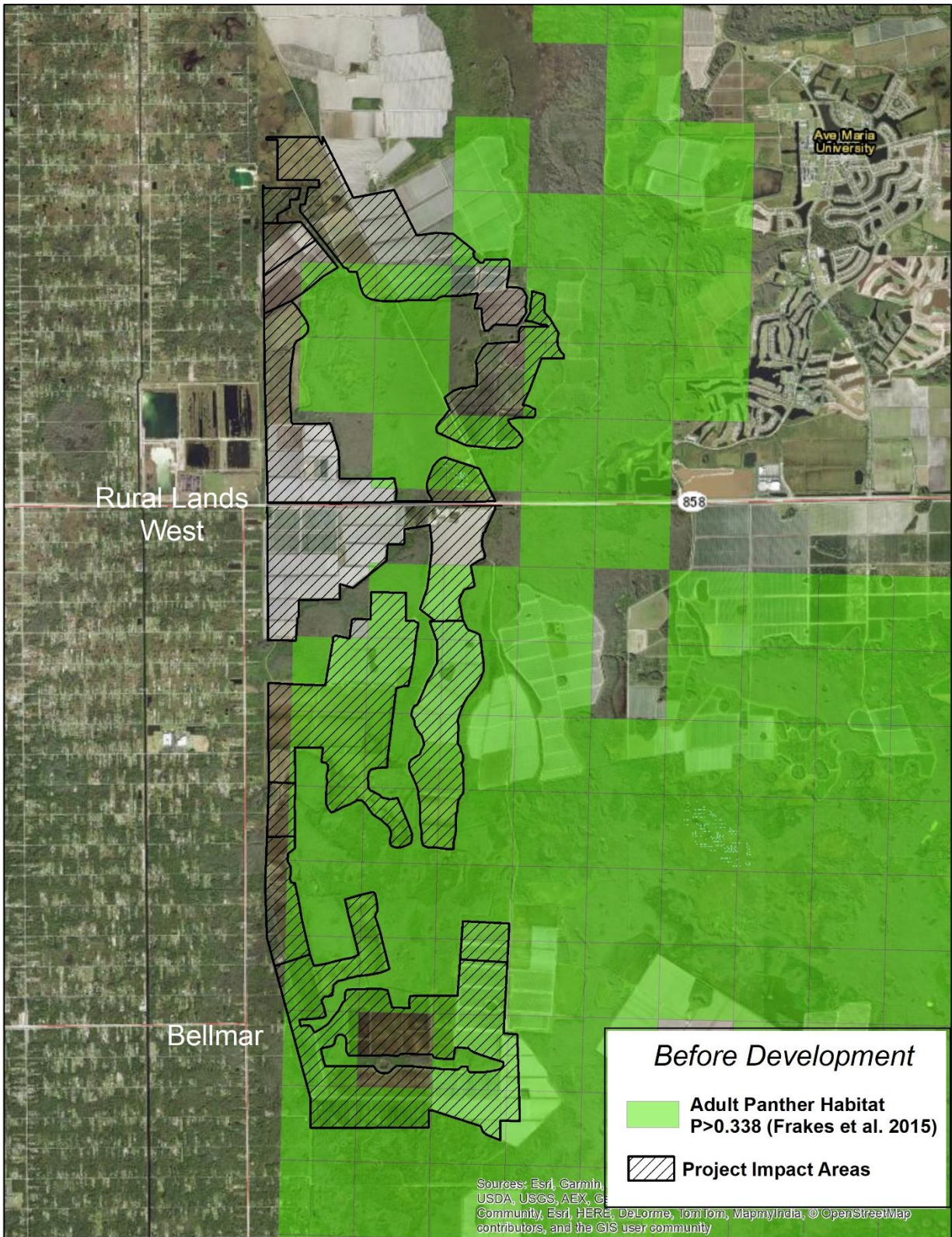
Figure 1. Adult panther habitat currently existing in the vicinity of the proposed Bellmar and Rural Lands West developments.
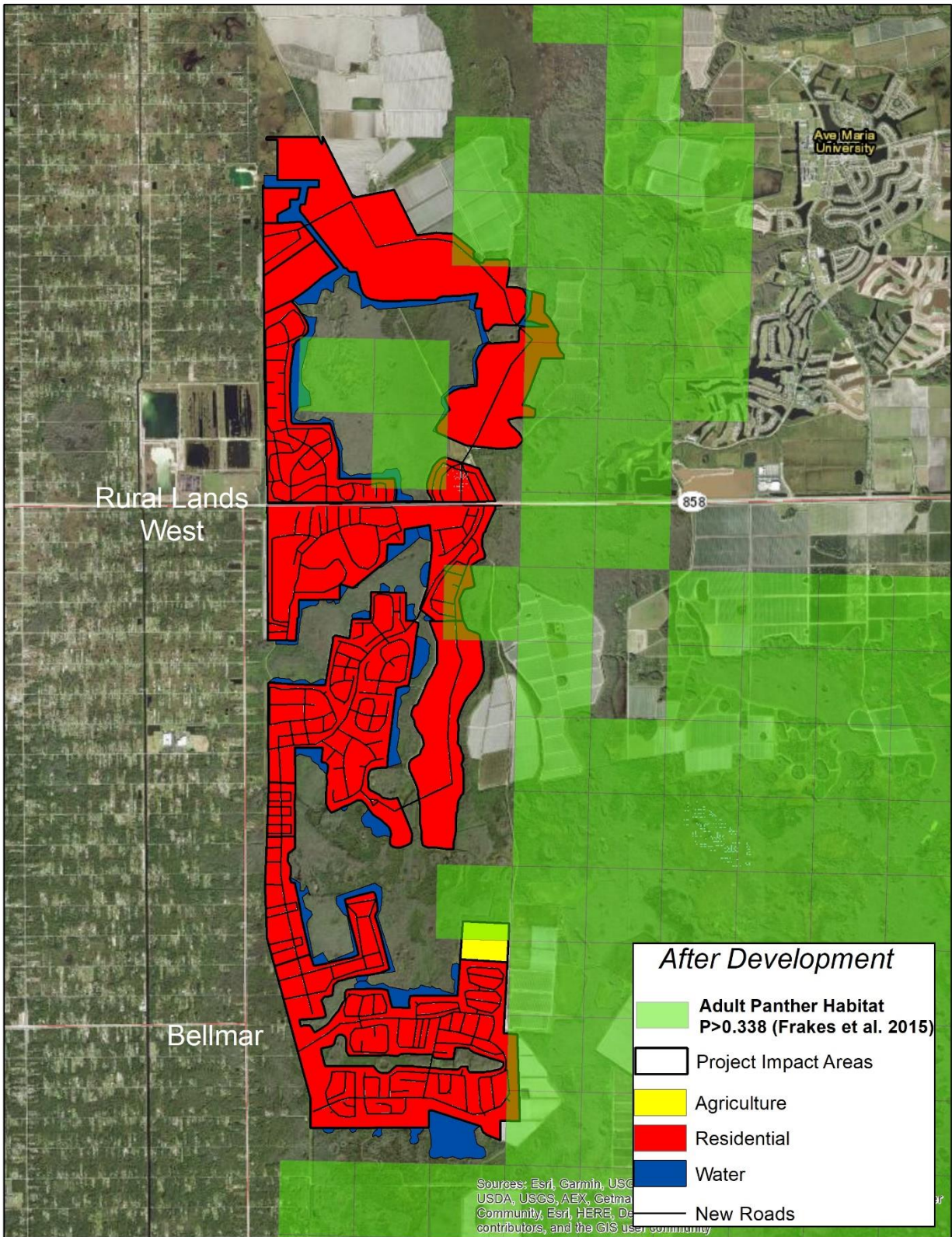
Figure 2. Model prediction of adult panther habitat that will remain after development of Bellmar and RLW.
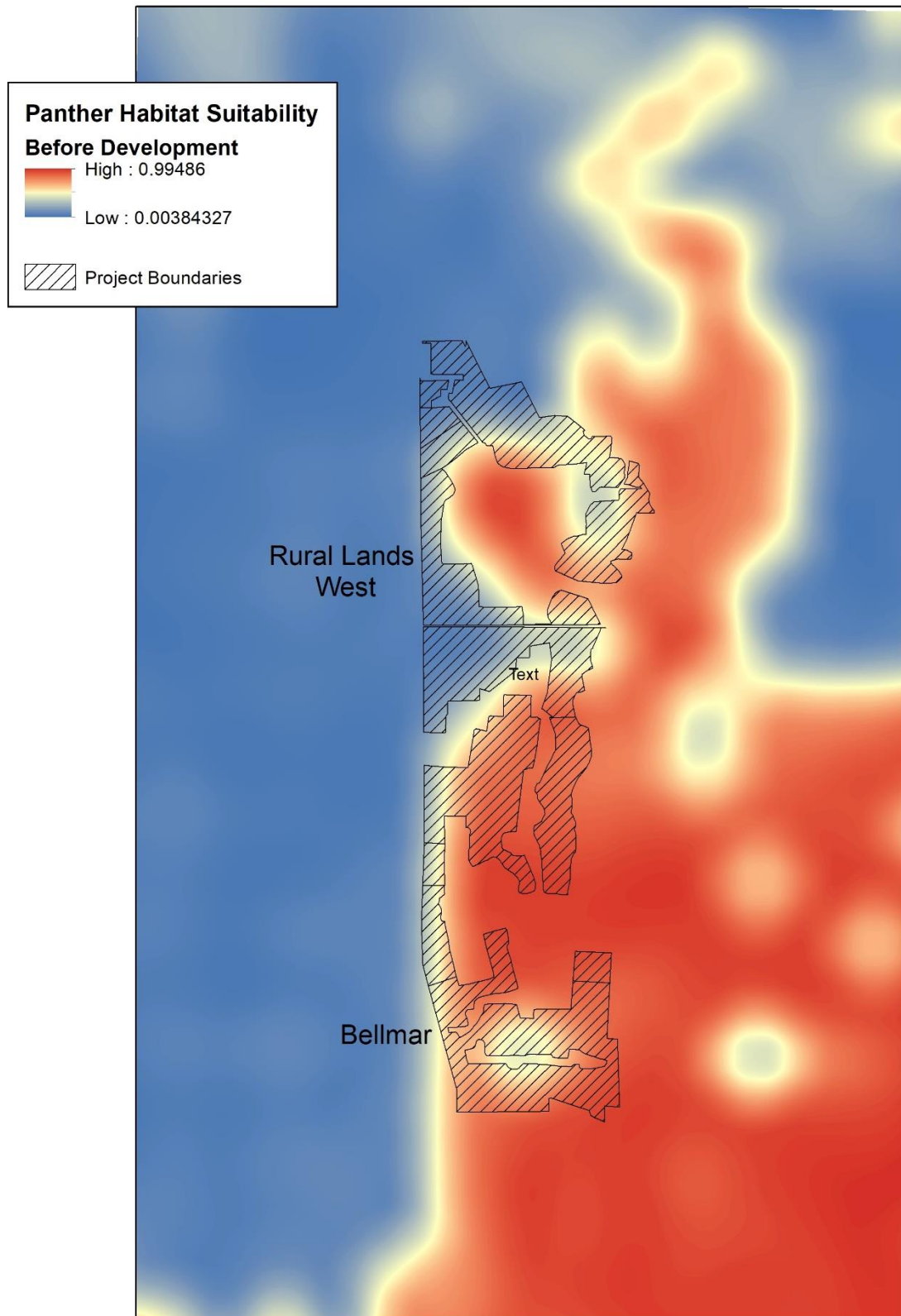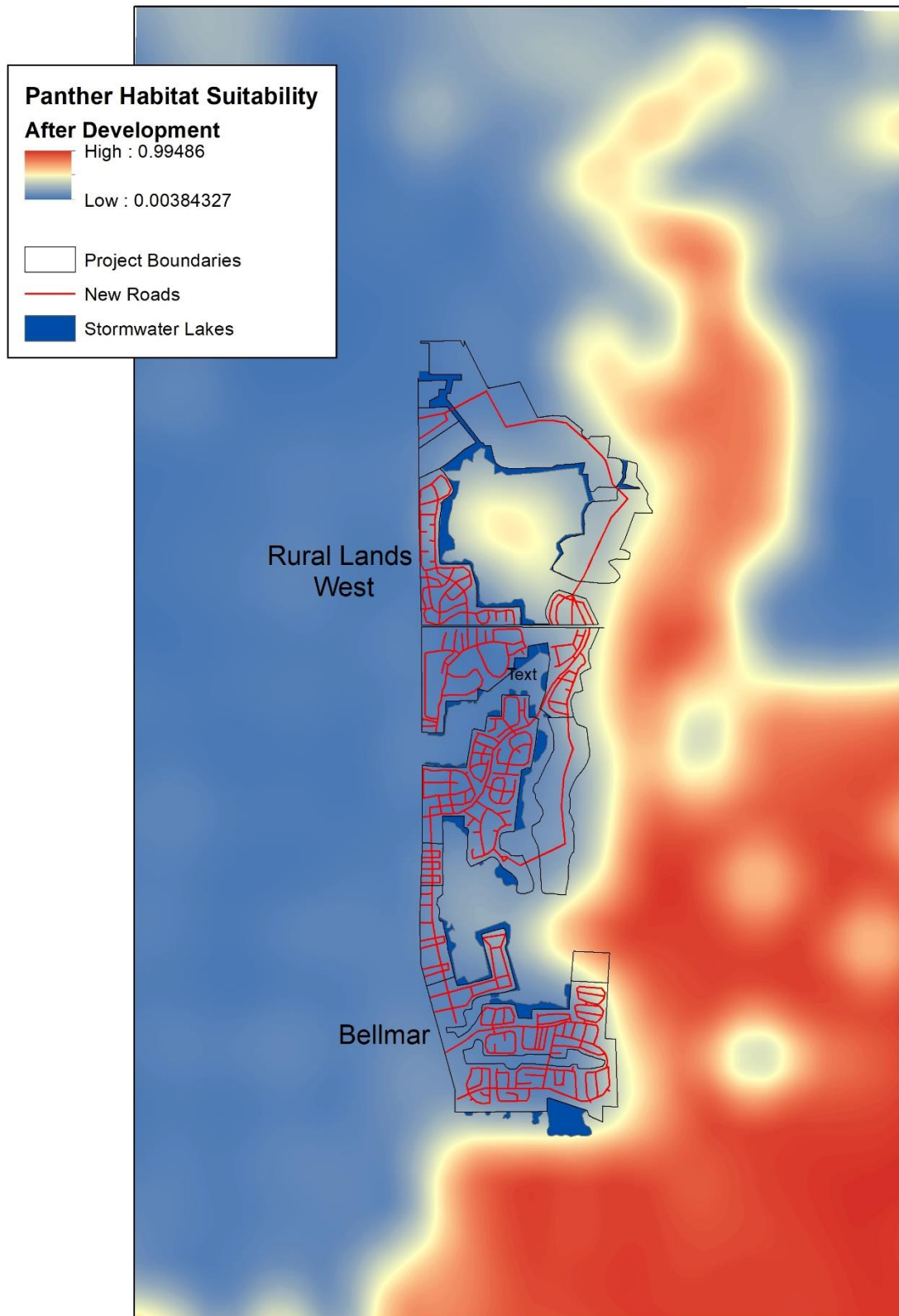
Panther Habitat Suitability
Before Development
High : 0.99486
Low : 0.00384327
Project Boundaries

Rural Lands West

Text

Bellmar

Figure 3.

Panther Habitat Suitability

After Development

High : 0.99486

Low : 0.00384327

Project Boundaries

New Roads

Stormwater Lakes

Rural Lands West

Text

Bellmar

Figure 4.

Figure 5.