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**UNITED STATES  
SECURITIES AND EXCHANGE COMMISSION**  
WASHINGTON, D.C. 20549

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AMENDMENT NO. 2  
TO

**FORM S-1**  
REGISTRATION STATEMENT UNDER THE SECURITIES ACT OF 1933

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**GEMPHIRE THERAPEUTICS INC.**

(Exact name of registrant as specified in its charter)

<b>Delaware</b> (State or other jurisdiction of incorporation or organization)	<b>2834</b> (Primary Standard Industrial Classification Code Number)	<b>47-2389984</b> (I.R.S. Employer Identification Number)
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**Mina Sooch**  
**Chief Executive Officer**  
**Gemphire Therapeutics Inc.**  
**43334 Seven Mile Road, Suite 1000**  
**Northville, Michigan 48167**  
**(248) 681-9815**

(Name, Address, Including Zip Code, and Telephone Number, Including Area Code, of Agent for Service)

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With copies to:

**Phillip D. Torrence, Esq.**  
**Joscelyn C. Boucher, Esq.**  
**Meredith Ervine, Esq.**  
**Honigman Miller Schwartz and Cohn LLP**  
**350 East Michigan Avenue, Suite 300**  
**Kalamazoo, Michigan 49007-3800**  
**(269) 337-7700**

**David Lowenschuss, Esq.**  
**Chief Legal Officer and Secretary**  
**Gemphire Therapeutics Inc.**  
**43334 Seven Mile Road, Suite 1000**  
**Northville, Michigan 48167**  
**(248) 681-9815**

**Divakar Gupta, Esq.**  
**Nicole C. Brookshire, Esq.**  
**Charles S. Kim, Esq.**  
**Siana E. Lowrey, Esq.**  
**Cooley LLP**  
**1114 Avenue of the Americas**  
**New York, New York 10036**  
**(212) 479-6000**

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**Approximate date of commencement of proposed sale to the public:**  
**As soon as practicable after the effective date of this registration statement.**

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If any of the securities being registered on this form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933 check the following box.

If this form is filed to register additional securities for an offering pursuant to Rule 462(b) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering.

If this form is a post-effective amendment filed pursuant to Rule 462(c) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering.

If this form is a post-effective amendment filed pursuant to Rule 462(d) under the Securities Act, check the following box and list the Securities Act registration number of the earlier effective registration statement for the same offering.

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or a smaller reporting company. See the definitions of "large accelerated filer," "accelerated filer" and "smaller reporting company" in Rule 12b-2 of the Exchange Act:

Large accelerated filer

Accelerated filer

Non-accelerated filer   
(Do not check if a smaller reporting company)

Smaller reporting company

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**The Registrant hereby amends this Registration Statement on such date or dates as may be necessary to delay its effective date until the Registrant shall file a further amendment which specifically states that this Registration Statement shall thereafter become effective in accordance with Section 8(a) of the Securities Act of 1933, or until the Registration Statement shall become effective on such date as the Securities and Exchange Commission, acting pursuant to said Section 8(a), may determine.**

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EXPLANATORY NOTE: We are filing this Amendment No. 2 (this "Amendment") to our Registration Statement on Form S-1, which was originally filed with the Securities and Exchange Commission on April 18, 2016 and has been previously amended by Amendment No. 1 thereto (as so amended, the "Registration Statement"), solely to include an updated Consent of Independent Registered Public Accounting Firm (the "Auditor Consent") as well as update Item 13 of Part II. With the exception of these items, no other information in the Registration Statement, including the prospectus that forms a part thereof, is being modified. Accordingly, this Amendment consists only of the facing page, this explanatory note, Part II of the Registration Statement, the signature page to the Registration Statement, the Exhibit Index, and Exhibit 23.1 filed herewith. The prospectus that forms a part of the Registration Statement is unchanged and has therefore been omitted from this filing.

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**PART II**  
**INFORMATION NOT REQUIRED IN PROSPECTUS**

**Item 13. Other Expenses of Issuance and Distribution.**

The following table sets forth all costs and expenses, other than underwriting discounts and commissions, payable by Gemphire Therapeutics Inc., or the Registrant, in connection with the sale of the common stock being registered. All amounts shown are estimates except for the Securities and Exchange Commission (SEC), registration fee, the Financial Industry Regulatory Authority, Inc. (FINRA), filing fee and the NASDAQ Global Market listing fee.

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	<b>AMOUNT PAID OR TO BE PAID</b>
SEC registration fee	\$ 5,636
FINRA filing fee	8,909
NASDAQ Global Market filing fee	125,000
Printing and engraving expenses	450,000
Legal fees and expenses	1,300,000
Accounting fees and expenses	365,000
Transfer agent and registrar fees and expenses	5,000
Miscellaneous expenses	40,455
<b>Total</b>	<b>\$ 2,300,000</b>

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**Item 14. Indemnification of Directors and Officers.**

The Registrant is incorporated under the laws of the State of Delaware. Section 145 of the Delaware General Corporation Law provides that a Delaware corporation may indemnify any persons who were, are, or are threatened to be made, parties to any threatened, pending or completed action, suit or proceeding, whether civil, criminal, administrative or investigative (other than an action by or in the right of such corporation), by reason of the fact that such person is or was an officer, director, employee or agent of such corporation, or is or was serving at the request of such corporation as an officer, director, employee or agent of another corporation or enterprise. The indemnity may include expenses (including attorneys' fees), judgments, fines and amounts paid in settlement actually and reasonably incurred by such person in connection with such action, suit or proceeding, provided that such person acted in good faith and in a manner he or she reasonably believed to be in or not opposed to the corporation's best interests and, with respect to any criminal action or proceeding, had no reasonable cause to believe that his or her conduct was illegal. A Delaware corporation may indemnify any persons who were, are, or are threatened to be made, a party to any threatened, pending or completed action or suit by or in the right of the corporation by reason of the fact that such person is or was a director, officer, employee or agent of such corporation, or is or was serving at the request of such corporation as a director, officer, employee or agent of another corporation or enterprise. The indemnity may include expenses (including attorneys' fees) actually and reasonably incurred by such person in connection with the defense or settlement of such action or suit provided such person acted in good faith and in a manner he or she reasonably believed to be in or not opposed to the corporation's best interests except that no indemnification is permitted without judicial approval if the officer or director is adjudged to be liable to the corporation. Where an officer or director is successful on the merits or otherwise in the defense of any action referred to above, the corporation must indemnify him or her against the expenses (including attorneys' fees) actually and reasonably incurred.

The Registrant's amended and restated certificate of incorporation provides for the indemnification of its directors to the fullest extent permitted under the Delaware General Corporation Law. The Registrant's amended and restated bylaws provide for the indemnification of its directors and officers to the fullest extent permitted under the Delaware General Corporation Law. Each of the Registrant's amended and restated certificate of incorporation and amended and restated bylaws will become effective upon the closing of this offering.

Section 102(b)(7) of the Delaware General Corporation Law permits a corporation to provide in its certificate of incorporation that a director of the corporation shall not be personally liable to the corporation or its stockholders for monetary damages for breach of fiduciary duties as a director, except for liability for any:

- § transaction from which the director derives an improper personal benefit;
- § act or omission not in good faith or that involves intentional misconduct or a knowing violation of law;
- § unlawful payment of dividends or redemption of shares; or
- § breach of a director's duty of loyalty to the corporation or its stockholders.

The Registrant's amended and restated certificate of incorporation includes such a provision. Under the Registrant's amended and restated bylaws, expenses incurred by any director or officers in defending any such action, suit or proceeding in advance of its final disposition shall be paid by the Registrant upon delivery to it of an undertaking, by or on behalf of such director or officer, to repay all amounts so advanced if it shall ultimately be determined that such director or officer is not entitled to be indemnified by the Registrant, as long as such undertaking remains required by the Delaware General Corporation Law.

Section 174 of the Delaware General Corporation Law provides, among other things, that a director who willfully or negligently approves of an unlawful payment of dividends or an unlawful stock purchase or redemption, may be held liable for such actions. A director who was either absent when the unlawful actions were approved or dissented at the time may avoid liability by causing his or her dissent to such actions to be entered in the books containing minutes of the meetings of the board of directors at the time such action occurred or immediately after such absent director receives notice of the unlawful acts.

As permitted by the Delaware General Corporation Law, we have entered into indemnity agreements with each of our directors and executive officers, that require us to indemnify such persons against any and all expenses (including reasonable attorneys' fees), witness fees, damages, judgments, fines, settlements and other amounts incurred (including expenses of a derivative action) in connection with any action, suit or proceeding, whether actual or threatened, to which any such person may be made a party by reason of the fact that such person is or was a director, an officer or an employee of Gemphire or any of its affiliated enterprises, provided that such person acted in good faith and in a manner such person reasonably believed to be in or not opposed to our best interests and, with respect to any criminal proceeding, had no reasonable cause to believe his or her conduct was unlawful. The indemnification agreements also set forth certain procedures that will apply in the event of a claim for indemnification thereunder.

There is at present no pending litigation or proceeding involving any of the Registrant's directors or executive officers as to which indemnification is required or permitted, and the Registrant is not aware of any threatened litigation or proceeding that may result in a claim for indemnification.

The Registrant has an insurance policy in place that covers its officers and directors with respect to certain liabilities, including liabilities arising under the Securities Act or otherwise.

The Registrant plans to enter into an underwriting agreement which provides that the underwriters are obligated, under some circumstances, to indemnify the Registrant's directors, officers and controlling persons against specified liabilities, including liabilities under the Securities Act.

## Item 15. Recent Sales of Unregistered Securities.

The following sets forth information regarding all unregistered securities sold by the Registrant in the three years preceding the date of this registration statement:

1. Between March 2009 and October 2014, the Registrant borrowed an aggregate of \$318,200 from, and issued promissory notes to, two of its executive officers. These promissory notes were refinanced in connection with the convertible promissory note financing discussed below. These transactions were exempt from the registration requirements of the Securities Act in reliance upon Section 4(a)(2) of the Securities Act or Regulation D promulgated under the Securities Act.
2. In November 2014, pursuant to the Plan and Agreement of Merger with Michigan Life Therapeutics, LLC, the Registrant granted 954,152 and 477,076 shares of common stock, respectively, to two of its executive officers. These transactions were exempt from the registration requirements of the Securities Act in reliance upon Section 4(a)(2) of the Securities Act or Regulation D promulgated under the Securities Act.
3. Between November 2014 and February 2015, the Registrant issued convertible promissory notes to 26 accredited investors, including the refinancing of two pre-existing promissory notes issued to two of its executive officers, for gross proceeds of approximately \$2.7 million. These notes converted into an aggregate of 516,428 shares of the Registrant's Series A preferred stock in March 2015. These transactions were exempt from the registration requirements of the Securities Act in reliance upon Section 4(a)(2) of the Securities Act or Regulation D promulgated under the Securities Act.
4. Between November 2014 and February 2015, the Registrant granted stock awards for an aggregate of 1,649,575 shares of common stock to certain of its employees, consultants and directors. These transactions were exempt from the registration requirements of the Securities Act in reliance upon Section 4(a)(2) of the Securities Act or Rule 701 promulgated under the Securities Act.
5. In March 2015, the Registrant issued an aggregate of 229,210 shares of Series A preferred stock to 18 accredited investors at a per share purchase price of \$6.70585 for an aggregate purchase price of approximately \$1.5 million. These transactions were exempt from the registration requirements of the Securities Act in reliance upon Section 4(a)(2) of the Securities Act or Regulation D promulgated under the Securities Act.
6. In July 2015, the Registrant issued convertible promissory notes to 36 accredited investors in a private placement for gross proceeds of approximately \$2.8 million. In December 2015, the Registrant issued additional convertible promissory notes to 30 accredited investors in a private placement for gross proceeds of \$2.7 million. In February 2016, the Registrant issued additional convertible promissory notes to five accredited investors in a private placement for gross proceeds of \$0.2 million. In April 2016, the Registrant issued additional convertible promissory notes to 22 accredited investors in a private placement for gross proceeds of \$5.0 million. These transactions were exempt from the registration requirements of the Securities Act in reliance upon Section 4(a)(2) of the Securities Act or Regulation D promulgated under the Securities Act.
7. In March 2015, the Registrant issued 675,250 shares of its common stock to Pfizer Inc. pursuant to its exclusive license agreement with Pfizer Inc. This transaction was exempt from the registration requirements of the Securities Act in reliance upon Section 4(a)(2) of the Securities Act.
8. Between May 2015 and December 2015, the Registrant granted stock options under its 2015 Equity Incentive Plan (2015 Plan) to purchase an aggregate of 302,842 shares of common stock, having exercise prices ranging from \$1.344 to \$3.587 per share, to certain of its employees, consultants and directors. The Registrant issued a total of 2,436 shares of common stock pursuant

to the exercise of these options at an exercise price of \$1.344 per share, for aggregate proceeds of approximately \$3,274, through December 31, 2015. In addition, the Registrant intends to grant options to purchase an aggregate of 1,825,200 shares of common stock to its officers, directors, employees and consultants with a per share exercise price equal to the initial public offering price in connection with this offering. These transactions were exempt from the registration requirements of the Securities Act in reliance upon Section 4(a)(2) of the Securities Act or Rule 701 promulgated under the Securities Act.

The offers, sales and issuances of such stock awards and options were deemed to be exempt from registration under the Securities Act in reliance on Section 4(a)(2) of the Securities Act or Rule 701 in that the transactions were under compensatory benefit plans or contracts relating to compensation as provided under Rule 701. The recipients of such securities were employees, directors or bona fide consultants of the Registrant and received the securities under a compensatory contract or the Registrant's 2015 Plan. Appropriate legends were affixed to the securities issued in these transactions. Each of the recipients of securities in these transactions had adequate access, through employment, business or other relationships, to information about the Registrant.

None of the foregoing transactions involved any underwriters, underwriting discounts or commissions, or any general solicitation or advertising. All recipients had adequate access, through their relationships with the Registrant, to information about the Registrant. Furthermore, the Registrant affixed appropriate legends to the share certificates and instruments issued in each of the foregoing transactions setting forth that the securities had not been registered under the Securities Act and the applicable restrictions on transfer.

**Item 16. Exhibits and Financial Statement Schedules.****(a) Exhibits.**

<b>EXHIBIT NUMBER</b>	<b>DESCRIPTION OF DOCUMENT</b>
1.1#	Form of Underwriting Agreement, including Form of Lock-Up Agreement.
3.1#	Second Amended and Restated Certificate of Incorporation of the Registrant, as amended, as currently in effect.
3.2#	Form of Third Amended and Restated Certificate of Incorporation of the Registrant, to be effective as of the closing of this offering.
3.3#	Bylaws of the Registrant, as amended, as currently in effect.
3.4#	Form of Amended and Restated Bylaws of the Registrant, to be effective immediately prior to the closing of this offering.
4.1#	Form of Common Stock Certificate of the Registrant.
4.2#	Investor Rights Agreement, dated as of March 31, 2015, by and among the Registrant and the Investors listed therein as amended by First Amendment to Investor Rights Agreement, dated as of April 14, 2016.
5.1#	Opinion of Honigman Miller Schwartz and Cohn LLP.
10.1*#	Form of Indemnification Agreement.
10.2*#	2015 Equity Incentive Plan and Form of Grant Notice, Stock Option Agreement and Notice of Exercise thereunder.
10.3*#	Form of Amended and Restated 2015 Equity Incentive Plan, effective upon the execution and delivery of the underwriting agreement related to this offering.
10.4*#	Form of 2016 Employee Stock Purchase Plan, effective upon the execution and delivery of the underwriting agreement related to this offering.
10.5*#	Employment Agreement by and between the Registrant and Mina Sooch, to be effective as of the closing of this offering.
10.6*#	Employment Agreement by and between the Registrant and Jeffrey S. Mathiesen, to be effective as of the closing of this offering.
10.7*#	Employment Agreement by and between the Registrant and Charles L. Bisgaier, to be effective as of the closing of this offering.
10.8*#	Form of Executive Officer Employment Agreement.
10.9+#	License Agreement, dated April 16, 2011, by and between the Registrant and Pfizer Inc.
10.10#	Office Space Sublease Agreement, dated as of January 1, 2015, by and between the Registrant and Michigan Life Ventures, LLC, as amended on May 6, 2015, August 31, 2015, September 25, 2015, October 23, 2015, December 16, 2015 and March 4, 2016.
10.11#	Lease Agreement, dated as of May 18, 2016 and commencing on August 1, 2016, by and between the Registrant and North Laurel Project, LLC.
10.12#	Form of Note Purchase Agreement dated July 31, 2015 as amended on December 10, 2015, March 27, 2016 and April 14, 2016.
10.13#	Form of Joinder Agreement to Note Purchase Agreement.
10.14#	Fourth Amendment to Note Purchase Agreement and Convertible Promissory Notes dated April 26, 2016.

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10.15\*# Non-Employee Director Compensation Policy.

23.1 Consent of Independent Registered Public Accounting Firm.

23.2# Consent of Honigman Miller Schwartz and Cohn LLP. Reference is made to Exhibit 5.1.

24.1# Power of Attorney. Reference is made to the signature page hereto.

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\* Indicates management contract or compensatory plan.

+ Registrant has omitted and filed separately with the SEC portions of the exhibit pursuant to a confidential treatment request under Rule 406 promulgated under the Securities Act.

# Previously filed.

**(b) Financial Statement Schedules.**

No financial statement schedules are provided because the information called for is not required or is shown either in the financial statements or the notes thereto.

**Item 17. Undertakings.**

The undersigned Registrant hereby undertakes to provide to the underwriters at the closing specified in the underwriting agreement certificates in such denominations and registered in such names as required by the underwriters to permit prompt delivery to each purchaser.

Insofar as indemnification for liabilities arising under the Securities Act may be permitted to directors, officers and controlling persons of the Registrant pursuant to the foregoing provisions, or otherwise, the Registrant has been advised that in the opinion of the SEC such indemnification is against public policy as expressed in the Securities Act and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the Registrant of expenses incurred or paid by a director, officer, or controlling person of the Registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered, the Registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question of whether such indemnification by it is against public policy as expressed in the Securities Act and will be governed by the final adjudication of such issue.

The undersigned Registrant hereby undertakes that:

- (a) For purposes of determining any liability under the Securities Act, the information omitted from the form of prospectus filed as part of this registration statement in reliance upon Rule 430A and contained in a form of prospectus filed by the Registrant pursuant to Rule 424(b)(1) or (4) or 497(h) under the Securities Act shall be deemed to be part of this registration statement as of the time it was declared effective.
- (b) For the purpose of determining any liability under the Securities Act, each post-effective amendment that contains a form of prospectus shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.
- (c) For the purpose of determining liability of the Registrant under the Securities Act to any purchaser in the initial distribution of the securities, in a primary offering of securities of the undersigned Registrant pursuant to this registration statement, regardless of the underwriting method used to sell the securities to the purchaser, if the securities are offered or sold to such purchaser by means

of any of the following communications, the undersigned Registrant will be a seller to the purchaser and will be considered to offer or sell such securities to such purchaser:

- (i) Any preliminary prospectus or prospectus of the undersigned Registrant relating to the offering required to be filed pursuant to Rule 424;
- (ii) Any free writing prospectus relating to the offering prepared by or on behalf of the undersigned Registrant or used or referred to by the undersigned Registrant;
- (iii) The portion of any other free writing prospectus relating to the offering containing material information about the undersigned Registrant or its securities provided by or on behalf of the undersigned Registrant; and
- (iv) Any other communication that is an offer in the offering made by the undersigned Registrant to the purchaser.

**SIGNATURES**

Pursuant to the requirements of the Securities Act, the Registrant has duly caused this registration statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Northville, State of Michigan, on the fourth day of August, 2016.

**Gemphire Therapeutics Inc.**

By: /s/ MINA SOOCH

\_\_\_\_\_  
Mina Sooch  
*President and Chief Executive Officer*

Pursuant to the requirements of the Securities Act, this registration statement has been signed by the following persons in the capacities and on the dates indicated.

<u>SIGNATURE</u>	<u>TITLE</u>	<u>DATE</u>
/s/ MINA SOOCH _____ Mina Sooch	President and Chief Executive Officer (Principal Executive Officer)	August 4, 2016
/s/ JEFFREY S. MATHIESEN _____ Jeffrey S. Mathiesen	Chief Financial Officer (Principal Financial and Accounting Officer)	August 4, 2016
* _____ Charles L. Bisgaier, Ph.D.	Chief Scientific Officer and Chairman of the Board of Directors	August 4, 2016
* _____ Steve Gullans, Ph.D.	Member of the Board of Directors	August 4, 2016
* _____ P. Kent Hawryluk	Member of the Board of Directors	August 4, 2016
* _____ Kenneth Kousky	Member of the Board of Directors	August 4, 2016
* _____ Pedro Lichtinger	Member of the Board of Directors	August 4, 2016
* _____ Andrew Sassine	Member of the Board of Directors	August 4, 2016

\* Pursuant to Power of Attorney.

By: /s/ MINA SOOCH

\_\_\_\_\_  
Mina Sooch  
*Attorney-in-Fact*

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NUMBER**

**DESCRIPTION OF DOCUMENT**

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23.1 Consent of Independent Registered Public Accounting Firm.

23.2# Consent of Honigman Miller Schwartz and Cohn LLP. Reference is made to Exhibit 5.1.

24.1# Power of Attorney. Reference is made to the signature page hereto.

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\* Indicates management contract or compensatory plan.

+ Registrant has omitted and filed separately with the SEC portions of the exhibit pursuant to a confidential treatment request under Rule 406 promulgated under the Securities Act.

# Previously filed.

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## QuickLinks

### [PART II INFORMATION NOT REQUIRED IN PROSPECTUS](#)

[Item 13. Other Expenses of Issuance and Distribution.](#)

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**Consent of Independent Registered Public Accounting Firm**

We consent to the reference to our firm under the caption “Experts” and the use of our report dated March 18, 2016 (except for the effects of the reverse stock split described in Note 14, as to which the date is May 6, 2016) in the Registration Statement (Form S-1 No. 333-210815) and related Prospectus of Gemphire Therapeutics Inc. dated June 13, 2016.

/s/ Ernst & Young LLP  
Detroit, Michigan  
August 1, 2016

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